A Policy Comparison of the Relevance of Secondary School Technical and Vocational Education Initiatives for Low Attaining Students in Scotland and Ontario from 1984 to 1990

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Abbreviations

CRDI	Curriculum Review Development and Implementation
HMI	Her Majesty's Inspectorate
IPRC	Identification placement and Review Committee
LEA	Local Education Authority
MET	Ministry of Education
MSC	Manpower Services Commission
NDP	New Democratic Party
OECD	Organisation For Economic Co-operation and Development
SCC	Scottish Curriculum Committee (later Council)
SCOTVEC	Scottish Vocational Council
SED	Scottish Education Department
SEED	Scottish Executive: Education Department
SCRE	Scottish Council for Research in Education
SEN	Special Education Needs
SOSB	Scottish Office Statistical Bulletin
SQA	Scottish Qualifications Authority
TVEI	Technical Vocational Initiative

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CHAPTER 1: QUESTIONS THIS THESIS ADDRESSES

1. Introduction

This thesis compares changes to educational policy and practice that occurred in Scotland and Ontario in the 1980s. Larger trading markets and the new technologies have created pressures resulting in unemployment, particularly of youth, in many post-industrial societies. Educational systems have had to respond to political pressures to prepare secondary students for their future and for the world of work. There was regeneration of the debate around how benefit is derived from publicly funded secondary schools. One aspect of the debate centred on the provisions of technical and vocational education and how to prepare young people at the lower ends of attainment who are not prepared to move into the work world.

As new curricula were adopted throughout the two education systems in the late eighties, the low attaining students became the focus of each system. Technical education, because it teaches usable skills, is more relevant to the learning of low attaining students. Therefore, interest in technological education experienced by low attaining developed in response. The policy responses to this subject and the changes to education that the policies began led to my interest in this comparative case study. It examines the interface of policy making with the functions of teachers to understand the educational context of these students from an educational perspective.

This chapter describes the background and outlines the issues. The chapter includes a brief introduction to the methodology, including a description of the analysis. Finally, after discussing the importance of this topic, I shall report on what is possible for these students. The last segment in the chapter is an overview of the rest of the thesis.

As a case study, this thesis can examine how policy influences education and how educators participate in policy decisions in each location. It can consider how educators safeguard the interests of their low attaining students, an objective in each policy. This thesis inquires into the legitimacy of the changes in the education of these students. As these changes were changes of structures, a structural-functionalist analysis of pre-sixteen (mandatory) and post-sixteen (post-mandatory) education in conjunction with the attainment measures, can support this

examination as it reflects the interests and the opportunities available to different students. The flexibility and control of the policy-making processes by educators determine the level of access to courses for low attaining students. While identifying the contributions of educators, this thesis then raises questions regarding the gains for these students. How educators understand these students' capabilities both at the level of theory and in practice is one question this thesis addresses. The way in which these educators view education as being relevant to these students' experience explains in part the educational solutions that come to be accepted.

While my hypothesis is that the changes made no differences to the employability of these students, this thesis proposes that a fuller understanding, which does not focus on ranking of students but on what they can do, can broaden the debate regarding them. The discussion presents directions for furthering the opportunities of these students.

A comparative analysis of policy making first requires an examination of each system's documents, which can identify the issues related to both low attaining students and technical and vocational education and to their complex interrelationship. With this approach, movement away from a limiting view of low attainment can broaden the educators' debate around the issues for decision makers to develop concepts, theories and approaches that further enable these students to participate in society.

To address these research issues requires both qualitative and quantitative methods. Through the examination and comparison of each case study themes are identified and their implications raise a broader question of fairness. An assumption of this thesis is that students should have the broadest possible opportunity for self-actualisation within the educational system and beyond. Part of a teacher's responsibility is to question any limiting school policies on their students' behalf.

1.1 Terms

There is considerable discussion about the terms vocational, technical, technological and practical education, and skill and training. These terms may constitute a continuum or be false differentiation due to definition overlap. One differentiation suggests that academic education applies to theory and vocational applies to practice. That which

concerns itself with the practical or useful supposedly is not theoretical. Because academic studies can also be a vocation and theory also deals with the practical these definitions seem to be a matter of degree and of tradition.

Vocational relates to jobs. It may be a trade or a profession or an unskilled job. The difference in common understanding is in the job requirements. The skills, the acquired ability, along with the education required become part of the differentiation.

P. Ainley and M. Corney (1990) argue that work is broken down into the skills required and that jobs become the specified content determined technically. Some jobs are learned on the job, meaning that the employer shows the worker what to do; education is not a main consideration. These are the unskilled jobs.

With more complicated jobs, apprenticeships provide a specific training content over a specific time during which the learner-worker is paid by the employer. According to Ainley and Corney (1990), training has come to mean apprenticeship in the UK.

As the length of training and the number and difficulty of the skills required increase along with the type of apprenticeship, some jobs acquire the connotation of a profession. Some authors argue that this is a class distinction based on culture and economy (Willis, P., 1987; Finn, D., 1987; Ainley, P. and Corney, M., 1990)). The educational requirements for a profession usually require more than secondary schooling and thus claim to be academic. The burden of cost is not usually borne by the employers.

A.N. Whitehead (1929) claims that technical education is training usually for manufacturing. Though it requires manual skill, normally it also involves the scientific. The scientific basis, he argues, is first-hand information from practice, which brings the debate full circle. Whitehead also argues that the strength of technical education is its concreteness or application, and that the training for it should be broader than specialisation.

Recently technological education has come to imply some aspect of information technology or computer study. T. Conlon (1989) argues the

rational for these courses is often vocationalist. The labour-market demand is for specialist training. The main requirements are to match the skills of graduates to available jobs, although he makes the point that keyboard skills remain important at the secondary school level.

For this thesis appropriate education is not an 'either or' debate between academic and vocational education, but a balance between the two. Further discussion of terms is included in each policy analysis.

Each location defines what is 'relevant' and so this thesis explores the differences in the way in which the policies use the term as evidence of how each system regards its students. For the purposes of this study, 'policy' is not a constant but an interplay through political action of different policy goals (Barrett, S. and Fudge, C., 1981) at different stages of their implementation. This is the policy and implementation continuum, and there are changes in some terms and ideas used at each stage (Downey, L., 1988) and by some personnel. These changes provide part of the analysis below.

The stated aim of the policy for both education systems is to provide updated technical education relevant to all students.

For Scotland, the policy position of the then governing Conservatives, in the UK, defined 'relevance'. Their aim is to explore and test ways of organising and managing technical and vocational education for 14- to 18-year olds 'for across the ability range' (Appendix B; Manpower Services Commission (MSC), 1982; Scottish Education Department (SED), 1989). As this is a very broad definition of technical and vocational education (TVE) it is necessary to explore by case study what this means in practice. The aim of the MSC's Technical and Vocational Educational Initiative (TVEI) differed from that of the (SED). Both curricula provided universal access within technology to turn out more students with qualifications of direct value to the workplace, and the SED adopted the MSC's approach of real-world problem solving, personal development, work experience and collaboration with industry. The foregoing criteria ensure that technical education is relevant to the workplace according to the MSC. The TVEI policy statement makes reference to the practical application of knowledge for work, or 'vocationalism' as it was termed. C. Chitty (1986) argues that the MSC is introducing work-related skills or vocationalism on behalf of

employers; he calls this practice a 'Trojan Horse'. The intent of the MSC is to prepare people for a specific mainly blue-collared job, but not for the professions or management. According to D. Raffe (1991), education in England, Wales and Scotland is similar but England and Wales did not adopt the comprehensive concept as readily as Scotland. Furthermore, G. Hitchcock (1988) reports that the implementation differed in England and Wales for there, each secondary school developed its own project. With the agreement in Scotland, the MSC's funding in secondary schools introduced a system-wide 'mixed model' definition of relevance (see Chapter 4). The policies were further interpreted by individual schools to some extent. What are the implications for technical education? The educational organisation and curricula structures that were established or changed as a result of the policy definition of relevance are key to this research. Control and flexibility of the curriculum and its certification became elements of the professional and political issues that arose from this initiative and are examined in this thesis by means of a questionnaire (Appendix A).

In Ontario, educators from the Ministry of Education (MET) and the Boards developed the idea of what is 'relevant'. When the Conservative government established the original working group, it sanctioned the development of a new curriculum policy document. The document addresses the wider use of computer technology in industry. 'Relevance' in Ontario means providing students with the new technologies, which are understood to mean computers. The knowledge and specialised skills of the new technologies are important to advanced-level (credit) courses (Appendix C; MET, 1984). While the provisions of the policy are universal, the singling out of a part of the student population has implications (Chapter 5). This policy includes a restatement of the previous Ministry policy as to the nature of the basic level courses (Appendix C; MET, 1985) for the low attaining students. Currently there is a 'mixed model' in vocational education that includes both in-school and out-of-school components.

This thesis recognises a third meaning of 'relevance', one that is similar to both 'mixed model' definitions. For the purpose of this thesis, a 'relevant' education is one that provides for all students to be self-sufficient at the end of secondary education. This would mean the recognition of their certification of work-related skills in the

community. This definition emphasises the ability of students based on criteria-referenced examination without ranking. This is a form of relevance found in the German mixed model (Croxford, L., et al, 1991; Clasen, J. and Freeman, R., 1994). It uses a skill-centred interpretation of relevance. Rather than focusing on a student's deficiencies, as determined by low attainment and associated with low ability (see Chapter 2) in the curriculum, the learn-by-doing solution is practised. The implications of the particular definition are examined in that chapter.

1.2a Why Technology Is Important

When students leave school without suitable skills for employment, there is a high social cost, both to the students and to society. In both Scotland and Ontario, young people turn to a network of community supports to establish themselves in their communities. While the descriptions of such networks are beyond the scope of this research, it is important to be aware that the social costs of these networks rise in direct proportion to the number of students who leave without marketable skills. The social network or further schooling may have to provide the service that the secondary schools could provide. The failure to provide for attainment by these students during an earlier stage of their education limits their present opportunities, delays their becoming self-sufficient and produces unnecessary or additional costs.

When attainments are valued only as they relate to higher abilities, the system marginalises low attaining students. The work experience that is part of technical education is a concrete approach to education and is suited to the learning style of these students (Epstein, H.T., et al 1978, 1979 cited by Oppenheimer, J., 1990; Brooks, J.G. and Brooks, M., 1993). The abstract theoretical approach of the academic provision proves inappropriate for them, as evidenced by the annual Scottish Office statistics (1991) and MET's statistics (1991).

High quality schooling for the low attaining students has the potential of forestalling later costs, as the German experience suggests (Prais, S.J. and Wagner, K., 1985; Conners, B. and Sweeney, K., 1990; Croxford et al, 1991; Davies, B., 1991; Clasen, J. and Freeman, R., 1994). In Germany low attaining students receive an education and training that leads to certification and employment for 90 per cent of them (Conners and Sweeney, 1990). Appropriate social structures at the secondary

school level allow students to have a smooth transition to self-sufficiency.

1.2b International Context

In the late 1970s and early 1980s, there was a renewal of the political debate around the benefits of publicly funded secondary schools. That debate was especially lively in Scotland and in Ontario, Canada. It resulted from the world-wide increase in youth unemployment (Finn, D., 1987; Brown, A., 1989; Shirley, I., 1989). The leading industrial nations were Germany, Japan and the United States of America which meant the United Kingdom was experiencing economic pressure and led it to examine secondary education (HMSO, 1985). Of the three, Germany provided the impetus, financially and developmentally through the Organisation for Economic Co-operation and Development (OECD) for the UK to rationalise its labour force along with other EU members. During the same period labour forces in the other industrial nations were rationalised.

One positive aspect of the continuing education debate centres on the preparation of students through the practical approaches of technical and vocational education. Although it has been criticised, this form of education focuses on the learning of skills. In the UK, objections came from the left, as Chapter 2 discusses. Irrespective of the debate, the governments of this case study introduced policies to improve this area of secondary schooling. In Scotland two initiatives developed. The first, directed by the Scottish Education Department, was for secondary school technological curriculum development. The second development was the Technical Vocational Education Initiative (TVEI), which was directed by the Manpower Services Commission (MSC) for a variety of training centres, including secondary schools. Ontario introduced a new curriculum policy called 'Technological Studies Intermediate & Senior Divisions, 1985'.

How to prepare young people for participation in society is a dilemma for schools, because schools cannot always foresee the future demands of the marketplace (Dennison, S.R., 1984). The problem is further complicated for students who are at the lower end of attainment. Authors such as D. Finn (1987) and D. Ashton et al. (1990) believe that these students are not prepared to move into the work world after secondary school because of structural barriers encountered during and after their

education. The main barrier is the decline in jobs. In the UK, Ainley and Corney (1990) indicates the decline related to historical attitudes regarding blue-collared training, whereas generally in other countries shifts in labour markets were occurring.

Secondary school is the critical period where students make career decisions and indeed, due to low and non-attainment, may have their career paths blocked. Secondary schooling either supplies the entry requirements or creates barriers to course selection that leads ultimately to work (Bell, C., 1988).

This thesis examines the policies and responses of each education system, particularly the distribution of the initiatives and their benefits to low attaining students. These initiatives are one political solution to preparing youth for the work world and to rising youth unemployment (Ashton, D. et al., 1990). Following their introduction, both governments expected that more students would seek secondary school certification in technical education, thereby improving their prospects for employment. This thesis will examine whether more certification did in fact occur.

1.3 Setting National Attainments

For each location, this thesis examines the provision for attainment across the ability range, since the reporting of student outcomes at the time of this research is limited. The issue of attainment for the students considered here is not part of national educational attainment goals. Neither Scotland nor Ontario specified attainment goals in the early eighties although the Dunning report had made a proposal (1977). Each location is interested in the high attaining students as a matter of historical tradition.

On the issue of attainment and ability, T. Brighouse and W. Moon (1990) call attention to the following as stated national goals of education. Both the French and Japanese expect that nearly three-quarters of the population can have certified attainments. The British schools expect less than a fifth to have the same attainment as certified by the Japanese. The French programme raises nearly three-quarters of the population to baccalaureate level. These goals of approximately 75 per cent almost coincide with the definition of average and above in one definition of ability for the total student population (see Note Chapter

2). Those national goals do not include all ability groups whereas Germany's does certify all groups, including 90 per cent of their low-attainment group. In Ontario, the goal for student attainment is undefined. Scotland does have a general statement of the number of students generally expected in three attainment groups as outlined in the Dunning report (1977).

The inclusive aim of each stated policy raises the question whether the local interpretation represents a continued academic bias within the definition of work-related skills. The thesis seeks therefore to examine each system's control of the policy agenda in schools to examine what has changed in practice.

Reports on the goals of the initiatives indicate the level of accountability and perhaps another aspect of the systems' capacity to control the initiative. Nevertheless, attainment indicates the expectations at the national level and the local level. The discussion flows from the perspective of local curricula and practice regarding the lower third of students in the ability range. The reporting mechanisms of comprehensive classes identify these students. Currently, examination in Scotland designates them to a level 5, 6, or 7, called foundation, a designation suggested by Dunning (1977) but introduced later. In Ontario, the designation is as a basic student and as a failure with less than 50 per cent based on classroom examination. The present definitions of special needs or special education can include the above student groups and are at times related to psychometric assessment (see Chapter 2).

1.4 Analytic Approach to the Thesis

Analysis of education policy covers a broad field. The breadth of education policies and models requires a synthesis of analytic approaches. To address the broad policy field requires a combination of approaches which at the same time illustrates the numerous relationships between education and employment policy. The concern here is to maintain the focus on the issue of low attaining students during one policy change in technical vocational education at a time where other education changes were occurring.

For policy analysis, M. Hill (1991) suggests primarily political or other dominant-group based analyses. The theoretical basis of analysis

in his view has a variety of origins: theories of the state, such as, pluralism, public choice, elitism or instrumental Marxism; structuralist perspectives with or without functionalism, Marxism or economic determinism without Marx. This thesis does not emphasise the party politics outside the education system that such authors as C. Benn and J. Fairley (1987), and A. Brown and J. Fairley (1989) present from the perspective of the left. The policies in question are those that the educators shape, whereas the external literature serves the political party system. This thesis does acknowledge that the origin of the policy represents the voice of the Conservatives representing the interests of employers and is a response to rising youth unemployment.

Other approaches suggested by Hill (1991) are the policy processes which include corporatist and economic theory of bureaucracy; policy making processes which characterise decision making; varieties of implementation approaches; organisational processes; legal theoretical strategies; or bureaucratic and professional behaviour. The problem with using just one of the latter theoretical approaches for analysis is the neglect of other views and dimensions of each policy, thereby perhaps missing some aspects. The politicians who introduced each policy support the demands for the schools to improve skill levels. Although each initiative was introduced by politicians, their departments are not directly responsible for implementation. The interest of this thesis is the response of the educators delegated to attend to the policy direction.

Another view based on governance is that of L. Downey (1988) who does address educational policy specifically. He suggests that analyses of education provide information for governance. The process of making policy is part of governance whereby the policy itself becomes the instrument of that governance. The type of analysis used varies by the stage of policy development, and it focuses on the process. This approach to analysis has the advantage of including the theories of politics outlined by Hill (ibid.) and those of the experts on a specific issue, in this instance, education.

The above assumes that the policies in question are put into effect as their originators intended, but happenstance, innovation and opposition may intrude. This thesis considers the numerous analytic approaches as facets of each policy event to provide for a more inclusive and reality-

based perspective. These include elements of R. Whitmore's (1984) comparative model that focuses on resources, organisation and essential personnel as part of a structural-functionalist analysis. Whitmore focuses on the core policy and unravels its layers as the policy develops. The main inputs are components found in C. Easton's system model (1965) which lends itself to education policy analysis because these elements, now stated as policy outputs, are the basis of change. These components generate further outputs that are further analytic dimensions. The addition of P. Gregg's evaluative model (1976) enhances the quality of the analysis because it attends to the value base not addressed in the systems approach. Gregg draws attention to the least privileged and their rights, who in this thesis are the low- and non-attaining students.

The two individual case studies form the comparative basis of this thesis. First it will highlight the Technical Vocational Educational Initiative (TVEI) introduced in Scotland in 1983 along with the parallel SED development of technology education. The second case study is the curriculum initiative introduced in technology education in Ontario in 1984. To take into account shifts in emphasis during the implementation of these policies, the analysis will use the time dimension included in L. Downey's (1988) analytic framework. This moves from initiation, creation, analysis (feasibility) and choice to installation and finally to review.

These analytic approaches may add to the policy and education debate by drawing attention to the way in which the educators respond to government initiatives and by providing the basis for a comparison of the systems. This thesis examines the response of educators, from the perspective of theory and practice, to low attaining students who were included as an aspect of each policy. It compares the policies of each system relative to the future employment opportunities available to such students.

An essential part of this thesis is the way in which those responsible for implementing the initiatives interpreted, defined and accepted the initiative from the perspective of fair treatment and the possibility of work-related outcomes. While the relationships between persons in the political domain on the one hand, and those in the educational domain, on the other, are an important factor in shaping and implementing the

policies, the education structures and the functions they serve determine the results.

A fundamental question of this research is how teachers plan for student attainment and how those students are prepared for their place in the community. The way in which teachers view education as being relevant to their students defines the curricula approaches. The interpretation of differences in ability by schoolteachers in relation to curricula is presented, and includes a discussion of the concepts that rely on past educational history and understanding of access and merit that explain attainment. This thesis includes these issues in a wider context than the relationship to the labour market. This thesis questions the relationship between low ability and low attainment as the basis for denying relevant education and its certification by the ranking of students, a practice characteristic of both education systems. Although there is emphasis on the importance of certification for work and beyond for the low attaining population if it lacks community recognition its meaning is questionable.

After describing the response by the educators involved, the thesis addresses the continued interest by society in the self-sufficiency and hopefully, employment for these students based in the dignity of work (Corson, D., 1991). The education debate of attainment as it relates to employability continues, in part due to how mandatory education is provided, the understanding of ability and the availability of opportunity to students of different abilities. The educational structures that provide opportunities reflect the underlying theoretical approaches. The discussion presents a direction for furthering the opportunities of students based in equity.

A further underlying assumption in this thesis is that one goal of education is to prepare students for employment. Consequently, policies that limit a student's potential for employment should be challenged. For this reason to widen the certification of work-related skills for all students, this thesis presents an international comparison. The purpose is to seek solutions for that segment of the population who will find less than satisfying work or no work owing to the surplus of labour in the changing economies.

1.5 How This Research Examines the Topic

Any research design must be based on methods that are appropriate to the research questions. Here the question is to how best examine the education provided to low attaining students. Hence the research deals with policy questions, and that necessitates an examination of the situation before and after the policy changes. Those educators who shape the response of the educational systems to policy are in a position to identify the current theory and practices. To better understand the educational outcomes possible for students comparison with other approaches are used.

Using on the analytic approach developed to examine policy, this thesis primarily examines the relevance of the technical education for foundation-level students (Munn, 1977 and Dunning, 1977) in Scotland (see Appendix B) and for basic-level students in Ontario (see Appendix C). The developments of the technical education policies include them. Chapter 2 examines the ranking theories and practices that encourage or discourage the students in question to seek certification.

The interviews and the results of a questionnaire identify the functions and opinions of the important educators and identify the concepts and theories operating in practice in relation to the students. Their functions are the following: planning for each system's policy implementation; establishing their school's policy in relation to the initiatives; establishing the school's programmes in relation to the initiatives; and promoting students within technical and other subjects. These four functions are the implementation tasks of schoolteachers for the technical and vocational policy. The purpose of the questionnaire is to elicit information at the classroom level.

This research does not suggest that the students in each location who have low attainment, non-attainment or failure, are directly comparable. Each system's structure uses an assessment approach that identifies students, and each system produces a number of students without certification. In comparing the case studies, the research examines the results in each system in terms of the equity and equality of the certification.

The technical co-ordinators that oversee the students are also of interest to this research, as they have a profile of the low attainers and of those who ultimately become non-attainers. It may be that the

students' education profiles resemble each other in the two countries. This information could influence future educational approaches to the students in question and thus further the debate surrounding the purposes of the initiatives. First, though, the methods used to examine the topic are described.

To present the case study of each location and the comparison of the two, a triangulation of research methods is used to verify the data collected. These methods are an examination of documents of governments, Education Authorities for Scotland and Boards of Education for Ontario and an analysis of these materials; interviews of government, Authority and Board personnel; interviews with schoolteachers and classroom visits where the policy is implemented and analysis of the questionnaire (Appendix A) which was mailed to technology schoolteachers charged with policy implementation. These methods make it possible to describe the structures in place before and after the policy was implemented and to compare the two.

This research identifies the technical subjects that were available in the mid-1980s in Ontario and Scotland. It uses a variety of analyses to illustrate the interpretations of the new technical policy in both jurisdictions, as well as the use of funding in both locations. The description of each locale's provisions for the students of interest is the basis of the comparative case study. Important organisational features thereby identify the main issues. Finally, the thesis evaluates the effectiveness of the changes made in the two settings from the results of each policy with attention to student certification and possible employment. The conclusion discusses issues arising from the evaluation.

The objectives of this comparison are to examine, first, the policy changes in technical education in Scotland and Ontario and, second, their implementation. Each education system developed a distinct model based on concepts of student ability, differentiation and certification. The respondents' interpretation of students' learning needs question the preparation of low attaining students to be self-sufficient through recognised certification. Additional adjustment to the educational structures may be required in order to enhance their employability. This thesis evaluates the Ontario and Scottish responses providing for low attaining students in relation to the work-related aims for technology

education.

1.6 The Reasons for Comparative Studies of Technical Education

Comparative studies have a long history in technical education. The balance between academic and vocational education has been discussed since the ancients. This debate continues still, and was defined more recently in Scotland by the former MSC (Appendix B) and then reinterpreted by the SED. Similarly, in Ontario, since the beginning of the twentieth century the provision of technical education in secondary schools has been discussed repeatedly.

Both Scotland and Ontario state that current economic problems are a new basis for teaching technical subjects in secondary school level (SED, 1989; MET, 1984). Furthermore, both governments have expressed dissatisfaction with student attainment in each education system.

The announcement of initiatives in 1983 and 1984 with the promise of improved student attainment led to my interest in this research. My interest is that each policy adheres to the principle that includes low attaining students and addresses their development towards self-sufficiency. In addition, the concern is that each definition of these students in discriminatory terms serves to reinforce ideas of elitism. To offset this systemic bias would be fair treatment of these students and opportunity for certification that provides for their future participation in their community.

To help explain the dynamics involved, a description of change theory as compiled by M. Fullan (1982, 1991) is included. Fullan provides research on the sources, processes and outcomes of change. He focuses in part on the roles at the local level. While the research base is North America, he emphasises the problems associated with change in order to contribute to the broad picture. Given the focus of this research is on the nature of low attainment within each initiative, each system attempts to deal with the problem of change. The difficulty with using this research is that it is local to various education districts and it provides little information on the larger context of the research and therefore the conditions for use in other areas.

Two overlapping and interacting issues are the focus of the interest in the recent changes. At issue is whether the technical initiatives

created structural changes that improved education for these students because of the way governments intervened. The second issue is the distribution of the educational benefit of the initiatives because of the profession's response to government intervention. Both locations use a type of classroom organisation to teach the curriculum that embodies their implementation. Does this improve student attainment or the possibility of future employment?

1.7 Why a Comparative Study of Scotland and Ontario

There are several benefits to studying other systems of social policy (Jones, C., 1985). First, the contrast with the local situation provides a better understanding (ibid.) of the need for this form of education. A comparative study allows for identification of attainments and adds to the range of ideas and solutions (Jones, 1985) for particular issues in providing technical education for low attaining students. As well, a comparative study provides an opportunity to learn from the experience of others in dealing with similar forms of secondary schooling. Finally, because of research, some theoretical benefits (ibid.) may occur for policy development, implementation and education. Improved certification and awareness among the educators could result.

A 'change theory' may identify basic principles in order to establish better practice methods or approaches to issues, and to provide for a new understanding of these issues and the conditions that encourage change. Often these provide the innovations that occur during periods of curriculum experimentation and implementation.

Scotland and Ontario have different ways of providing for low attaining students yet similar comprehensive secondary school organisation. During the period that this research examines, the manpower policy in both places was directed by a Conservative government while the education policy was dominated by a Labour party. As well, each had a labour-dominated local government. The economies of Scotland and Ontario are similar, each having one major urban economic centre - Glasgow and Toronto - smaller cities and large rural areas. During the policy changes, both areas were adjusting to a decline in manufacturing, in addition to attempting to maintain market viability in larger trading markets.

Economic pressures in both areas led to the introduction of policy

changes to the technical curriculum at the secondary level in order to upgrade the skills of the students in preparation for their entry into the labour market. Through this period, youth unemployment in Scotland remained high, in part because of the large numbers in the succeeding cohorts (Raffe, D., 1984,88). Similar demographic patterns existed in Ontario, in that unemployment was highest among 16- to 24-year-olds (MET, 1984).

Although the comprehensive school is the usual form of secondary school in each location, the curriculum differs in its approach to low attaining students and those who leave school without certification. In Scotland during the eighties, students had undifferentiated curricula. Similar curriculum provides a form of equal opportunity but not the opportunity to benefit equally from education. In Ontario, low attaining students are in classrooms with students of similar ability. This form of classroom organisation, known as streaming, is a form of segregation and discrimination based on ability. The curriculum presented to these students differs from that of other streams. In Ontario, therefore, curriculum is differentiated by level of difficulty and is taught in the classroom to students of similar ability and with similar prospects of attainment. In the late eighties Scotland moved to this streamed approach; both areas used ranking to differentiate students.

1.8 Secondary School in Scotland

Historically, Scotland has had an academically based secondary school system, which originated in the provision of a classical education for the wealthy (Flude, M. and Hammer, M., 1990). The system has had a frank interest in preparing students who attain at a high level for post-secondary schooling and in continuing this tradition (Raffe, D., 1984,88). As in England, this schooling took place mainly in grammar schools until the 1960's, when comprehensive schools were introduced. Scotland adopted this model more widely than England (Raffe, 1997). Ninety per cent of these schools offer six years of schooling: four compulsory years are followed by two optional years (SEED, 2000).

In Scotland, students are grouped primarily according to age, starting at age 12 in Secondary one (S1; Raffe, 1983) after six years of primary school (elementary). Until the mid-1980s students were undifferentiated and were taught in mixed-ability classes. Classrooms combine more than one level of ability and therefore have the designation 'unstreamed'.

The curriculum is similar for all students until the national examination at age 16, the fourth year (S4) in school (ibid.). Student attainment in Scottish classes vary widely reflecting the ranges of ability; about 30 per cent are expected to pass in at least three subjects (Raffe, 1983).

The delivery of the academic curriculum through the 1980's officially was through seven examined subjects or modes: social studies, English, mathematics, religious and moral education, physical education, science and creative or aesthetic studies. The SED prescribed these subjects most recently in 1982 following the Munn Report of 1977, with the suggestions of the Curriculum Council, supporting the replacement of some 40 subjects offered at 'O' grade (SED, 1977). Raffe (1997) indicates that owing to job action by teachers implementation did not occur until later and those subjects were not offered in most Authorities until the 1990s (SED with SQA, undated).

The courses are usually taught classes of 40 minutes daily, except for the electives. Local Education Authorities (LEA), which are independent, make their own selection of subjects, although the tradition is to accept the recommendations of the SED and the Scottish Curriculum Council (SCC). This means that the Authorities are more similar than different in their approaches.

In the mid-1970s, grading for the Scottish system of examinations also began to change (Dunning, 1977). Combined with additional curriculum changes in the eighties, a system began that gradually granted more certification to all students, the greatest change occurring for the bottom half of the student population (The Scottish Office Statistical Bulletin (SOSB, 1991)). This change in attainment occurred after the SED conducted a feasibility study (1978), an examination of S3 and S4, a Development Programme (1980) and an implementation plan (1982). Foundation students were defined and curriculum was pre-tested for them. After piloting these courses, differentiation came into effect with the acceptance of the move to Standard Grade by teachers.

In the seventies the streaming of students began formally after external examinations; that was how the SED legitimised the streaming of students based on ability. The provisions to the successful academic students have remained relatively unchanged up to and perhaps including the TVEI.

Those provisions include the possibility of more years of education and support.

Technical education was not recognised as a subject area until 1983. Before the TVEI, some Education Authorities included applications of science and other subjects that they considered technical. For secondary students who were not continuing on, at that time, non-advanced courses were available. These courses did not necessarily lead directly to any further path, whether to work or to apprenticeships according to Dunning (1977). Therefore, the school served other than educational purposes by differentiating among students of different ability.

Officially, Scotland uses examinations as its method of differentiation. However before the examinations, the classroom serves the process of selection through setting classes, to deter students who are likely to be unsuccessful in the examinations and to differentiate students. The teacher conducts in-class evaluations, which sometimes takes the form of a simulation of an examination. The examination results often reflect the school's area (SED, 1989).

Although one assumption, or 'myth' as characterised by Raffe (1984,88) and Flude (1990), is that students from lower socio-economic areas could qualify for academic education, in practice, that is rare (ibid.). Furthermore, the typical classroom method, which consists of teacher-led whole-class lessons, does not serve the students of lower ability (Munn, 1977; Dunning, 1977; Raffe, 1984). Throughout this period, there is no recognition of the varying styles or rates of learning. Teachers generally believe that the fundamental differences among students have to do with innate ability or intelligence, according to Munn (1977). Hence the student population becomes differentiated by the 'haves and have-nots' (HMI interview, 1992). For the above reasons interest in serving the full range of ability developed both from the Munn and Dunning reports and from the TVEI, a vocational plan announced by the Conservatives in 1982 to address youth employment.

The response to the Conservatives' TVEI plan was immediate. C. Chitty (1986) argues that with the TVEI the MSC introduced work-related skills, or vocationalism, on behalf of employers, the 'Trojan Horse'. The intent of MSC is to prepare young people for a specific occupation, mainly blue collared, but not for the professions or management. He, along with D.

Gleeson (1980) and D. Finn (1987), describes the approach as an attempt to 'deconstruct' the comprehensive schools. Preparation for specific jobs takes place through the post-secondary options available. The authors did not deal with the SED developments or the new pilot courses for the low attaining students resulting from the Munn and Dunning reports of 1977.

The problem with secondary school courses throughout this time, it is argued, is that they are not related to specific jobs, and that students leave school without skills for work. Disagreement with this argument comes from the perspective that the skills provided are generic. Some courses do have practical meaning because they teach an activity related to a job. This is the rational behind the learning activity such as writing a letter applying for a job. Writing letters may be seen as both job-related and a general skill for everyday use, and therefore practical. When it comes to activities in the applied sciences or mechanical arts, more specialised knowledge is acquired. These activities require not only practical application but also the use of special techniques and terms; thus the learning is technical or technological or scientific and is the basis for later job-specific skills. Therefore, for all levels of students the basis of the vocational curriculum is in primary school and is further developed in secondary school with first, general skills and later, specific skills. Some teachers argue that reading and mathematics are the basis for all later learning.

To return to the debate regarding the effectiveness of the two forms of classroom management described above, on the one hand, it is claimed that mixed-ability classes are not discriminatory, for all students are taught the same curriculum and hence receive equal treatment. However, in these classes, different groups emerge as the students respond to the learning material. Because of the academic emphasis low attaining students have little prospect of attaining work-related skills.

In streamed classes, on the other hand, the reverse is true. There is discrimination both in the classroom and in the curriculum, which is supposedly attainable by the students in question. This latter benefit gives these students the opportunity to achieve skills for certification. The streamed classroom is used in Ontario and is fundamental to the proposals of Munn and Dunning (1977), although the

TVEI initiative received most of the attention of critics of the vocational stream.

In 1983, the SED defined its approach to the TVEI and began piloting some courses. Then SED, based on the response to the various reports, announced the 'extension' of technology courses to all schools in 1986. It also defined the certifications, one of which allowed for the TVEI courses to receive recognition from SCOTVEC; the TVEI was subsumed by the new structures of the Standard Grade. The development of new courses now included the eighth subject, technology and three course levels began with these courses, their examination and certification.

During the same time, 1983-86, the MSC funded the development of the modular courses, some of which were taught in secondary schools and which received external recognition by the Scottish Vocational Educational Council (SCOTVEC). These courses were job-specific and became part of the student record.

1.9 Secondary School in Ontario

Ontario's publicly funded system of secondary education had its origins in a five-year academic programme. The needs of the non-academic student began to be recognised in the 1950s by the Department of Education, which established comprehensive schools that provided a four-year vocational programme. Some optional classes called 'opportunity classes' became available in some schools in the seventies for students who could not manage the four years of vocational education. Subsequently, all school-aged children gained entitlement to publicly funded education with special-education legislation in 1982.

Most students enter secondary school at about age 13 after eight years in elementary school. They may remain in secondary school until age 21, although most leave at about age 18.

Because of the practical nature of the former opportunity classes, practical courses evolved along with some technical and vocational courses intended for non-academic students (Appendix C) and became another 'stream'. A few specialised schools were established for these students. Most comprehensive schools were offering a selection of technology courses before this current initiative.

The differentiated, or 'streamed' courses, are at three levels of difficulty in comprehensive secondary schools: basic, general and advanced. Most publicly funded schools are comprehensives, although some specialised schools remain. The usual course is taught for seventy minutes a day, four courses a term; the school year consists of two terms. Today a student may take courses at any level of difficulty. Thirty courses (called credits) are needed in order to graduate (Ontario Schools: Intermediate and Senior, OS: IS, 1977). Sixteen of those are mandatory: English (five), mathematics (two), science (two), geography or history (one), physical education (one), history (one), French (one), art (one), technology or business (one), and one senior social science. The balance between intermediate- and senior-level courses varies. The remaining fourteen courses are electives, meaning the student may choose the subject and the level of difficulty of the course. Academic students take additional credits designated Ontario Academic Credit for university.

The choices of courses offered by any school depends on local numbers, the selections made by the students and the ability of the students. Various trades, such as mechanics, home economics and electrical trades are the basis of more than 60 technology courses. These practical courses based in trades for students in the basic level evolved gradually over the previous 20 years.

The courses in automobile mechanics, for example, may teach skills such as tyre changing, oil changing and minor body repairs. The student may have a work placement at a service station, and at the end of secondary school, there is the possibility of a job.

The difficulty with elective credits is that students at the basic level do not obtain a trade certificate but a secondary school diploma at the end of four years of schooling. A diploma indicates that the student took courses at the basic level. Some basic-level students may continue at a community college in courses called job-readiness training. The lack of meaning for employment of the technology courses available to basic-level students is fundamental to the determination of what may be relevant. In contrast, students in the general or advanced levels are able to receive recognised certification for some apprenticeship hours through the technology departments of secondary schools. Most of these trades require a secondary school graduation diploma obtained

concurrently. The first-year hours spent in shop classes count towards the apprenticeship in those trades.

The practical experiences in class provided during the 1970s were designed for students of low ability who, if they were assessed, were defined at that time as 'trainable retarded' and 'educationally retarded'. These designations were special-education designations based on individual assessments; they were related to ability and low attainment, as explained in Chapter 2. These were the students placed in the special segregated opportunity classes but now integrated into basic classes along with those not assessed. For them, adjustments of the learning activities meant fewer tasks, more time in which to complete a task and tasks that were broken into smaller segments than for the average or general-level student requires.

There was no specific testing for identification; if a student had been in the low group in the previous year, he or she continued in that stream. Ability grouping of the student population is the responsibility of the classroom teachers. They identify basic-level students as those who are generally in about the bottom third of the class, in other words, from the -1 to -2 Standard Deviation (St. d.) about 17 per cent (see Appendix D). Although students who are from the -3 to -4 range are entitled to public schooling, few programmes were available to that group. Most of them remained at home or in programmes provided by Social Services until full programming was introduced in the nineties.

Because of lobbying by various groups for rights and access, schools expanded their accommodation for the low-ability group, usually in segregated classes. Social Services at times assists by defining the content of their program. Ideally, voluntary organisations work along with the schools. Some of these students have special-education designation, but most low attaining students do not. The usual practice is to designate the lowest attaining students and others with disabilities, ranging in schools from about 10 per cent to 18 per cent, for special education. For the most part the resources available in the Boards of Education for special education determine the level of service and a continuum of classroom organisation.

During these developments, a review of technological studies in 1978-79 produced no immediate outcome or public report. The first education

reports released in Ontario were the results of the International Testing by the Centre for Educational Research and Innovation (OECD) in the mid-1980s. Documents and interviews (1991) failed to establish that a review led to the new policy, perhaps, as one Ministry of Education and Training (MET, 1991) official explained, because of changes of governments and personnel. In addition to the technology review, a review of all secondary schools concluded in 1981. In response to it, MET produced a document, outlining its plans in *THE RENEWAL OF SECONDARY EDUCATION IN ONTARIO* in which it outlined its plans. With the changes of governments through the 1980s priorities shifted.

In the early eighties the subject specialists in the MET began to develop a new approach to technology education that included the new technologies (Appendix C). They gained government acceptance and produced a new guideline in 1985 that outlined their intention to streamline the existing courses and introduce the new technologies. Each streamlined course was to have its own guideline. But because of changes of governments and priorities into the nineties, this plan was only partly put into effect (see Chapter 5).

1.10 Certification as the Benefit of the Initiatives

The thesis examines certification for employability as a benefit of education. The value of technical work-related skills is relevant for students and underscores the value of effectiveness. Moreover, each system recognises student learning through a certification process. It is not being argued here that future employability is the sole criterion for technical or any other form of learning; however, it is crucial for students who will not be furthering their education that employers recognise their certification of attainment. Recognition of certification takes on additional meaning for future employment when the certification is by attainment levels.

In both Scotland and Ontario, attainment depends on the students' responses to a range of learning activities or curricula. Through the evaluation process, each student is designated with a numerical value that is higher, lower or equal to other students of that age in Scotland or in that grade in Ontario. The reporting is not simply 'attained' or not, or incomplete for a specific skill activity. The attainment criteria in learning activities are established within the context of an age and a grade or year level in relation to others in the class. This

use of age norms or grade levels overlaid on the learning criteria creates a circular process that is evident in the curriculum, the classroom organisation and the evaluation of students. This process, rather than the ability to perform the learning task, is the basis for allocating students to groups of attainment.

The curriculum that is subject to evaluation is sanctioned by the educational body governing curricula: in Scotland, the SED with the Scottish Curriculum Council and SCOTVEC; in Ontario, the MET, which publishes guidelines from which the teachers develop their curriculum. Thus the government and the teachers control instruction, this thesis examines how that control is exerted through the various functions that affect students.

Both the SED and the MET base their evaluation of students on cognitive development. According to Munn (1977), the Scottish evaluation of cognitive functioning is understood, within psychometrics (see Chapter 2), to reflect the curricula provided and measured informally by teachers and then measured formally by external examinations given by the Scottish Examination Board. This evaluation system is a method of demonstrating to the public through report cards the success of the school and the education system. In the early nineties student attainments began to be published in Scotland, and this now serves as a form of evaluation of schools. In Ontario, during the time of this research, classroom teachers evaluated their students with examinations based loosely on psychometrics also. Regardless, given the various populations in schools, this thesis challenges the examination practice as meaningful in reporting student attainment.

1.11 The Low Attaining Student and Employment

The practical skills of the technology initiative help develop cognitive functioning because they are suited to the learning style of low attaining students, that is learn-by-doing. Understanding these students and using methods adapted to their learning need helps them to acquire certification. Therefore, technical education is important for skill development.

Technical education can be an important determinant of a student's future career and employability. Recent developments in relation to the provision of technical education indicate that low attaining students

are included in the employability aim. The evolution of the organisation for technical education curriculum includes a shift of relationships and accountability within such structures in Scotland that grant certification. The recent changes in the provision of technological education in Ontario provide a comparison for technical education in secondary schooling for low attaining students.

The relationship between education, training and youth employability is complex. At a time when the demand for skilled workers is increasing, there have been shifts within the unskilled sector. The service industry makes greater use of these workers than other sectors, particularly in part-time work, but in the global recession of the 1980s, the unskilled sector suffered layoffs as well. According to Ashton (1990), there is downward pressure in the UK on young unskilled workers from laid-off skilled workers. Meanwhile, in the unskilled sector, the total number of available jobs has decreased and there is a bias in favour of the female worker (ibid.). In Ontario, unemployment for 16- to 21-year olds is over 20 per cent. The decrease in unskilled jobs is projected to drop from 35 per cent of the total labour force to about 15 per cent in industrialised countries (Canadian Television Public Announcement, CTV, Feb. 1996) at the turn of the twenty-first century.

For these reasons, this research asks how the schools are responding to employment trends through their curricula. What is the role of education in preparing students for the world of work? What could assist the students of interest?

In their projections of future manpower needs specifically for technology beyond the next decade, M. Cetron and O. Davies (1991) conclude from their study of the labour markets that over 80 per cent of future jobs will require technical training, compared to the 50 per cent at present in Canada. Their projections claim that the majority of these technological jobs will be newly defined. They indicate more years of education will be required before entering the labour market. While projections of this nature may not materialise as rapidly or exactly as predicted, they illustrate that the prospects of those without skills are likely to become more dismal in post-industrialised societies of the information age.

This raises the challenge for of technical education (see Appendices B

and C) since the policy applies to all students, including the low attaining ones. How does the interpretation of each policy accommodate all students in response to their employability? The examination of the implementation will reveal the processes that in fact determine student attainment.

Given the recent policy changes that resulted in changes to the curriculum in technical and vocational education, it is not clear that the appropriate programme is in place for 'across the ability range' and for these students. It is time to evaluate the effectiveness of the initiatives, particularly for the least advantaged in the education system, who are defined as those students at the bottom of the attainment range.

One of the difficulties in studying this topic is the unspoken, the assumption that these students are less able or intelligent than the more academic stream of each system. The differentiation of attainment attempts to avoid this aspect of the discussion of ability (see Chapter 2).

A further difficulty related to ability is that there is not a perfect 'fit' between students and curriculum and attainment. Each system uses non-standardised informal evaluation by teachers for differentiating students, resulting in unequal treatment.

1.12 What is Possible

This section does not intend to examine other educational systems in detail. Rather it has a limited aim of raising the awareness of the results attained elsewhere for these students. The purpose is to indicate that a balance between education and training integrating the learning-by-doing method achieves results for low attaining students (see Note) in the German mixed model.

While possible criticism may be made of German early streaming, nonetheless there have been impressive results with the bottom half of the student population according to C. Jones (1985), MSC (1985) and DES/HMSO (1986). For these students, the learn-by-doing method of teaching results in certification of 90 percent at age 18 (Davies, B., 1991).

Mandatory requirements, however, beg the question: Should public policy to reduce unemployment legitimately override private decisions when public costs are a result of those decisions? This thesis questions the purposes of education for this student population. The various forms of what constitutes success in education and training systems will be explored in the comparative analysis and whether legitimacy is achieved.

1.13 Critical Period: The 1980s

In Scotland the critical period for policy interest in education and training (Raffe, D., 1984, 1988) was the 1980s. Up to that point, the education system had primarily directed its efforts towards the academic student. For the majority of students not going further in education, non-advanced courses were provided, but the incentive was for students to leave school at the end of compulsory schooling and enter the world of work. Unfortunately, the unskilled jobs that used to be available for school leavers have been declining since the 1980s. Further, there were complaints by employers about the quality of their employees (Brown, A. and Fairley, J., 1989; Ashton, D. et al., 1990), which led to the MSC response.

Ashton (ibid.) offers this political explanation of the attitude shift in the UK as a whole concerning technical and vocational education:

> The Great Debate focused on the 'failure' of the education system to meet the requirements of employers, and the need for a more vocationally oriented curriculum. More recently, there have been calls for higher standards of education. (p.216)

Ashton's explanation points to the earlier lack of adequate provision for all students, including the non-academic student and the student leaving school without secondary school standing. The TVEI initiative attempted to address this inadequacy for the UK, including Scotland.

During this same period in Ontario, student preparedness for the future and for new technologies were the focus of complaints (MET, 1984). However, in Ontario, the dissatisfaction was most notably with the academic students' lack of technological skills.

In both locations, economic pressure led to political pressure, which led to similar remedial perspectives and educational developments.

Before this period, questions arose concerning the benefit of the mandatory education provided to low attaining students, because of the

nature of the curriculum (Munn, P., 1977). A lack of opportunity to learn practical and usable skills is fundamental to the question of relevance. The nature of the curriculum ultimately limits the employability of these students because Scotland and Ontario certification does not provide qualifications that lead to employment. Furthermore, for these students and those with certification there is the added underlying problem of the lack of work and misinformation regarding those out of work.

These students fall outside the definition of special-needs students (Education Act (Scotland), 1980; and Bill 82, Ontario, 1982). No recognition by the system of the need for special provisions other than those which these curriculum initiatives attempt. Extra help may be available to some of these students, but unless it is in the classroom, the students fall further behind.

At this time, the extent and full nature of the issue is unclear given the intent of the initiatives.

At the end of the Great Debate in 1982, the British government announced new provisions for the 14- to 18-year-old group. In general, its aims were to raise the skill level of the labour force to maintain competitiveness in the marketplace. Similarly, Ontario announced its intention to raise the specialised skills for the new technologies for all students. The political agendas in both jurisdictions are essentially identical for this period.

In each location, the question remains whether there is the capability to act in an integrated manner at the national level and in the Local Authorities to achieve the aims of the initiatives. The controversy is one of local versus central control.

1.14 Outline of This Thesis

This thesis is concerned with the effects of recent initiatives in technical and vocational education in Ontario and Scotland. The need for measurable criteria for policy analysis and education related to student attainments directs both policy and education. This research evaluates adherence to the inclusion of all students in each policy in equity terms of opportunity, treatment and outcomes.

Chapter 2 is a literature review.

Chapter 3 outlines the methodological framework. This comparative case study uses triangulation of qualitative and quantitative research methods in order to include of a wide range of data. The variety of data-gathering strategies increases the reliability and validity of the data gathered.

Chapter 4 provides the case-study analysis of the policy changes related to the provision of the TVEI and technology curriculum implemented by the central government in Scotland from 1982 to 1990. The analysis uses Downey's stages (1988) to follow the developments, with their potential for inclusion, from the government level through to the Local Authorities and the individual secondary schools. This chapter also presents and discusses the results of the Scottish questionnaire.

Chapter 5 is a case-study analysis of the technical education policy of the Ontario government from 1984 to 1990. It follows the stages of these changes through to the local Boards of Education and to the individual secondary schools. This chapter also presents the analysis of the Ontario questionnaire results.

Chapter 6 compares the two systems, using the same policy implementation approach, including the functions of planning, school policy, programme and promotion used in the questionnaire. Issues and themes are identified, whether common or not, along with the responses of educators to them. Addressed is the relevance of the policy for the students of interest to this research. The chapter concludes with a discussion of the political and professional control of secondary education.

The final chapter, Chapter 7 presents the conclusions drawn from this research, summarises of the technical initiatives in each location and suggests possible policy and education options of future study within the wider debate of the policies and education. The discussion of the wider issues may lead to new approaches to provide for student progress. The discussion focuses on the changes developed as a result of the policy, particularly for the low attaining students in both systems. The interpretation given to the inclusive educational policy by those charged with implementing it is important in systems historically interested in the credit level (Scotland) and in advanced (Ontario)

students.

The wider pressures that originally generated interest in the policies and initiatives continue. The technical education provided with its importance to secondary school attainment by the low attaining pupil remains a critical issue. Both systems have policy responsibility to provide technical education for all ability levels. The reporting on each policy implementation provides an opportunity to improve student outcomes. This is a critical aspect, particularly if low attaining students are to forward their interests.

Note

The secondary schooling provides a balance between schooling and training. Certification achieved through this mandatory structure combines two days in school and three days in the workplace, or the reverse, depending on the education policy of the local area (Länd). This approach integrates apprenticeship and schooling (Prais, S. J. and Wagner, K., 1985; Connors, B. and Sweeney, K., 1990). The latter authors indicate that there are five principles involved. There is sharing of vocational and educational responsibilities by education, government and industry. Skill determination is the employers' responsibility. Education should have an alternative to the academic. The most effective instruction is learning-by-doing and co-operative and apprenticeship programmes must have ties to business.

While critics suggest that early streaming in the fourth year of school does not accommodate different rates of learning, the accommodation of these students in the community exceeds other models of education (op. cit.). The emphasis on language and mathematics, along with social studies including civics, prepares these students to leave school with enough skills to be self-sufficient.

Also in Germany, the controversial compulsory attendance until age 18 in addition to a responsive relationship with the industrial sector are additional factors in achieving this level of attainment. Important particularly for economically disadvantaged students, is the apprenticeship wage. The educational programme is very practical or concrete, focusing on basic literacy and numeracy related to the apprenticeship programme (German head teacher interview, 1993).

A special-purpose body of representatives from government, education and the trade unions determines the work-related skills. This tripartite body, dating back to the 1930s (Davies, B., 1991; Clasen, J. and Freeman, R., 1994), establishes the requirements for workplace apprenticeship placement and learning, and reflects current industry requirements. The working relationship between the various partners is a distinctive feature of this 'mixed model' system and is part of a youth policy that was designed to encourage citizenship while dealing with youth employment and delinquency (Clasen, 1994)

As a practical example, if a student were doing carpentry, there is an emphasis on measurement as related to dimensions. For a chef's apprenticeship, measurement as related to volume is the focus. This integration of mathematics occurs as the student is doing a practical

project in class, thus emphasising the required apprenticeship skill. The method of instruction is teacher-led with adequate drill and rote learning (German school visit, 1993).

CHAPTER 2: RESEARCH AND RELATED LITERATURE

2. Introduction

The focus of this chapter is the research related to the concepts of cognitive development and how schools interpret that into measures of ability or failure from the perspective of how individual students benefit from the systems' need to differentiate. Admittedly, teachers need a frame of reference to identify students' learning needs. That task is currently an aspect of the attainment structure as teachers move groups of students through the curriculum with examinations to indicate how much they have learned. This chapter examines how attainment is measured. Examined is the relationship of attainment to student development, teaching, and school organisation Also included are the evaluation results specific to the TVEI in Scotland, the Ontario approach pertinent to low attainment and school leavers, and recommendations for interventions.

The topics included in the literature review contain a vast body of information and for the purpose of this thesis, the relevant literature is summarised. The chapter identifies current issues that have a bearing on the relevance of the changes made to the education provided. Identification of schools as more or less successful in their teaching depends on the number of students attaining certification. Critics of this measure argue that a school's success may reflect the area it serves, curriculum choices or the school's resources among other things.

2.1 Measurement of Cognitive Development

One assumed purpose of schools is to support the cognitive development of students. Research on adolescent cognitive development and capacity has four major focuses (Adams, M. et al, 1976). The first is mental-test measurement and measures of cognitive growth over time, in years and months. This is the basis of assessment of ability for certification.

2.1.2 What Do They Mean By Ability?

One of the constructs that schools use to evaluate student attainment is ability. The policy statements in both locations refer to ability (see Appendices B and C). How schools define ability in their populations, the background to each view of ability, and its uses for instructional

and evaluation purposes is now examined.

The literature reviewed uses ability to mean the student's capacity for educational attainments. In both systems ability underlies the differentiation of students by tests and examinations, as evidenced by the policy statements that set out the aims of both systems directed to ability groups. The curriculum provided in the early 1980s in Scotland is stated to be undifferentiated until national examinations (SED, 1984) then by Standard Grade courses and their examination. In Ontario, differentiation by ability is through the students' responses to learning activities, classroom test and groupings. Both locales first use the idea of ability through informal evaluation of students by teachers and subsequent classroom grouping, from the time students enter school. Segregation by ability grouping results from these evaluations and may ultimately influence attainment and certification for employment. The opportunities afforded students are concern because of these early practices.

There are many questions regarding using the concept of ability as a method of selecting different curricula for students. Ability is reflected in the attainment rates and is considered time-bound; that is, students are expected to attain specific learning, for example, measurable behaviour, within a grade, or at the same rate as the peer group. Because of many factors, student attainment results vary with in these parameters.

The new TVEI in Scotland introduced criterion-referenced assessment to be used for grading of students. Theoretically this means that a student either attained the learning outcome or not. Ranking of the student in relation to other students is not usually part of this theoretical approach. However, in Scotland rankings are a traditional part of the attainment structure. This means that the criterion is not only whether the student attained the learning outcome, but how the attainment relates to that of other students and at that age group. This competitive element of attainment moves the emphasis of student evaluation from learning.

Therefore, the assessment practices that schools are using have these two means of distinguishing students. If the new forms of schooling only were concerned with learning, one could expect a change in the rate of

attainment and its certification. But given the persistence of ranking as part of the reporting of the assessment that leads to certification, even given the changes in other factors, the expectation is that student attainment would remain the same, or the null hypothesis.

This would hold for Ontario as well, as the curricula provided is appropriate to ability for attainment purposes. While Munn (1977, 1997) acknowledges that the original basis of Scottish examination is in psychometrics, other authors and approaches circumvent this issue.

The main aim of technical and vocational education is to provide that type of curriculum to all ability ranges. It is necessary to understand what is meant by ability, why it is relevant to the discussion of student evaluation and how it relates to the grouping by attainment used in schools. Therefore, the theory of the distribution of ability originally called intellect (see also Appendix D), in the student population follows below as it is applied to the secondary level. This theory provided the statistical grounding for all test results.

Though Scotland avoids the use of the term intellect, the results of testing are provided in a percentile form called 'scaling', which divides the population according to Dunning's proposal (1977) into three broad groups. In the production of statistical results from the SED or the SOSB, the reports of new initiatives are reported in percentages from high to low groups in groupings of 10 percent. While this may appear to be a different view of the student population, the description of students remains in relation to each other.

Munn (1997) criticises not only the tests, but early theories of intelligence as fixed and innate. While I am not advocating these tests, these tests are made up of sub-tests designed to evaluate the various elements that compose ability. They remain fundamental to diagnostic testing, and in Ontario they remain in use for special-education assessments and for integration of students into regular classrooms. The different forms of testing students whether by specialists or teachers becomes necessary for both practical and theoretical uses.

The assumption of school test scores thought to reflect ability is, first, that the secondary school student population is normal and that the test scores fit this distribution. Dunning (1977) proposed that the

test results divide on the percentages of about 15-25 per cent for credit, 25-30 per cent for foundation and the remaining 59-65 per cent for general. The SED (1991) choose to report both the 'O' level and Standard Grade level results in percentages of 10 while it changed the courses and assessments and defined the students for the next stage of schooling. This means that the traditional differentiation did not change in Scotland.

One would assume, that the assessments of the capabilities of all are independent of each other when it comes to the evaluation of learning outcomes or testing. In reality, however the way in which test results are reported requires the streaming of students into artificial attainment and perceived ability groups because there is not the simple acceptance of the attainment of the learning task regardless of other students' results.

For example, students attaining levels 5, 6 and 7 in Scotland are the 'less able' who have low attainment and, by implication, lower functioning ability on examination (Dunning, 1977; Black, H., 1980, 1984) than other students in that year. In the original formulation of the concept of 'foundation' by Dunning (1977), the bottom 25 to 30 per cent of students on examination, an approximation of the theoretical -1 to -4 standard deviation, acquire that designation. The Scottish system, therefore, forces the attainment results to show how students compare to other secondary school students. At the same time, for the TVEI the test results are criterion-referenced. The standard for the evaluation of modules is part of the module given to teachers. The standard indicates how students at each level, foundation - general and credit - are expected to respond to that module's test item. This expectation controls the criterion-referenced attainment process within the norm-referenced attainment standard.

Given the number of students in Scotland and Ontario in independent schools, the number of students in special needs (see section) and the existence of 'set' classes, the classroom population is not a normal population in either place. Consequently the distribution of test scores skews to the right and the use of percentages of students taking the tests may then be an inaccurate basis for designations. From year to year, as well, the overall group taking the tests varies, a factor that adds to the doubts already surrounding the accuracy of the formal and

informal designation of students.

For example, if the total percentage of two student groups, special needs and independent schools, was 9 to 14 per cent, there would be a deficit equal to 9 to 14 per cent somewhere in the curve, thereby changing its shape. Therefore, 9 to 14 per cent of the 17 per cent in the bottom group could have been elsewhere, perhaps in the general level at the bottom margin of that group.

In the original Standard Binet intelligence tests used in Ontario, the students attaining -4 to -2 standard deviation fall into the categories 'educable' and 'trainable retarded', respectively. Since these labels are no longer politically correct, Ontario uses the term 'developmentally delayed' as a substitute. Identification of these students may or may not be for special education (needs) and thus the benefit from appropriate schooling can vary. However, these students are usually identified informally by their classroom teachers as low attaining and having low-ability.

The importance of understanding this background to test results is that the low attaining group consists largely of the educable and trainable students. There is one additional group for consideration and that is the group of students who for a variety of reasons are functioning at this level although they have average or above-average ability. Since there is no requirement that these students be tested, they remain undefined as having educational needs although they are at the bottom of the group that teachers meet in the regular classroom. One of the purposes of Scotland's new policy is to provide work-related skills for all students across the ability range. Ontario's streamed classrooms intend to acknowledge the capability level of students through their attainment levels and to provide certification.

For policy evaluation, then, it is necessary to have a theoretical concept of the number of students and their response to technical and other subjects. When we understand the abilities of the group at the bottom of the attainment range, and provide for them in the system, it is clear that these students can stand to benefit. The student numbers anticipated should approximate the percentages associated with between the -1 to the -3 Standard deviation. It is interesting that these numbers approximate the percentage used to define attainment for the

'foundation' level in Scotland.

I have not found any challenges to the setting of this percentage for the foundation designation. If criteria based only on the capabilities of these students were reported rather than the definitions by percentages the discussion of the initiative and its effects could be on a very different conceptual base. The basis of the major criticism of any form of standardised test is the population differences between those who are taking tests and the population on whom the tests were standardised. The measure is not simply whether a student has attained a learning outcome. These issues will be examined in the case studies.

2.1.1.2 Special Needs

In both locations, arrangements for special-needs students have a variety of forms. Aside from special schools, these students are increasingly remaining in their local school and in regular classrooms. Because these students receive diagnostic assessments, the integration of the forms of assessments available occurs in the classroom. This means that the assessment by the teacher needs to correspond with that of the specialists, particularly when referrals are back and forth. The teachers argue that, in addition to being based on child development, their assessment requires appropriate curriculum.

In Scotland, G. Atherton (1989, citing Warnock, 1974) defines 'special needs' as applying to children with specific or complex difficulties, about 2 per cent of the student population. Assessment of these children's learning needs usually would include standardised tests given by a specialist. Also suggested for inclusion as 'special-needs' are those students with social and emotional problems who were awkward or disruptive in remedial classes, students who changed schools frequently or were absent and the 20 per cent of students with English as a second language. All these children were to be educated in local schools if possible. There is also provision for special schools and classes if needed for about 1.2 per cent (10,000) of these students. The less severely disabled students are in the mainstream classes and receive the same curriculum, with minor adjustments. But, the students of interest to this research are not included as special-needs students.

In Ontario, there are no aggregate data for special-education (special-needs) children that compare special-class placement with students kept

in mainstream classes. There are officially designated categories of 'exceptionality'. Each Board chooses its own way of identifying, through assessments, children for special education; the methods used are often based on the individual circumstances of the Board and its ability to serve these children. Which children are identified in each category of a recognised disability group also varies depending on the Board's interpretation of the terms. The most obvious area of diversity is the social and emotional 'special needs' category. Because of the differences in the theoretical approaches of the Board specialists, a student who may qualify in one board would not in another and he or she could be expelled from school for bad behaviour. The range in individual schools of identified special-education students is from 0 per cent to 18 per cent. Since the MET enrolment figures do not indicate the academic attainment or 'achievement' (the Ontario term) and many Boards integrate all students into the total student population, no evaluation of schooling for low attaining students is available. As in Scotland, the students of interest to this research remain undesignated as in special need (special education).

2.1.2 Cognitive Stages

The second type of cognitive measurement, based on observational studies, describes developmental patterns in cognitive stages. This approach rests on the teacher's observation of the child's response to learning tasks. The presentation of tasks follows a continuum of cognitive development. Assessment is in the form of descriptions of the child's responses and the next tasks for attainment on the continuum. This approach requires an individualised and well-documented curriculum, because it is time-consuming and it is not widely accepted.

The fact that ability differences may be influenced by the student's developmental stage is a factor that is critical in defining ability in secondary schools. Social and emotional development dominates a student's experience during this period (Piaget). Intellectual needs through this adolescent stage may vary widely and may not occur in the discrete stages described by Piaget and other researchers. The two dimensions of ability and developmental stage create wide differences in the learning needs of students. According to educators, the preferred teaching methods used to convey knowledge and to support student learning vary by developmental stage.

2.1.3 Cognitive Development of Language and Thought

The third main area of cognitive studies was developed by Vygotsky (1976, cited by Adams, 1976) and based on the development of language and thought, which are interrelated and mediate each other. This theory is particularly important to education for Vygotsky (ibid.) thought the main purpose of educators is to increase knowledge conveyed through language. Measurement of attainment in this area can take the form of continuous assessment or examinations based on age and grade-related measures. In education, language is recognised as a basic skill, fundamental to understanding and learning as the questionnaire will examine.

2.1.4 Cognitive Styles

The fourth area of cognitive research emphasises cognitive styles. This focus is on information processing and problem solving, both of which are thought to be metacognitive strategies, or ways of learning how to learn. The latter skill is of particular interest to the technical initiatives, since improving problem-solving ability is one of the aims in both education systems. As noted elsewhere, the initiatives did not identify their underlying research basis, but each area is a major field of research. What is identifiable is the use of concrete learning activities, an approach that does suit the adolescent developmental stage (see below).

The cognitive-style approach to instruction seeks to address the teaching method to use in lesson planning for students. In this following research the learning style is integrated into the understanding of the cognitive stage. According to Epstein et al. (1978, 1979, cited by J. Oppenheimer, 1990) 83 per cent of students aged 12 years have only, or are functioning at, the stage of concrete operations. In this stage, students learn beat in situations where real materials are used. For example, a student who is studying hydraulics could construct an object that moves with hydraulics. At 14 years of age, 25 per cent of students are at the formal-operations stage, meaning that they could learn to solve a design problem applying the theory of hydraulics without constructing the object. At 16 years of age, 33 per cent of students are at the formal operations-stage.

These statistics indicate to educators that information must be conveyed in concrete ways to be relevant to most students. Activity-based

learning approaches are the most effective during these early stages.

When activity based learning is coupled with the optimal approach suggested by Oppenheimer (1990 citing Kagan, 1981) it becomes co-operative learning. In this approach, the students work together and learn from each other in structured mixed-ability groups. This takes advantage of the student's characteristics when he or she is at a social stage of development, bringing together the three different methods. Co-operative learning, Oppenheimer (op cit.) argues, also assists students in getting along with others, a skill requirement of the workplace.

In contrast to the above is a teacher-led approach to learning, that includes drill and memorising of information. These methods provide better student test results, since this teaching is directed toward test requirements. The criticism of this method by child developmentalists is that the student does not necessarily develop some of the thinking skills, such as problem solving.

As in Scotland, the streaming that is characteristic of the Ontario system is not based directly on theories on ability. Streaming centres on a curriculum tradition linked to stages of cognitive development. Though the curriculum is loosely based on what most students of that age are capable of attaining, all students are not necessarily at the same cognitive age or stage at the same time. To accommodate differences in students, the basis of promotion is not by age in Ontario. Promotion is by achievement of the tasks measured by a mix of assessment measures throughout the term, part of which may consist of a final in-class examination. Students may repeat material in a grade when they are not successful.

Ontario does use statistical theory for the range of student responses to items used for evaluation. The first use is with test items constructed by the teacher to reflect emphasis of the curricula guidelines for that grade determined by the MET. Acceptance of the streaming that results occurs up to the end of elementary school, and is in the form of marks divided into high, medium or low groups. The results reflect a loose concept of what students are capable of doing based at a particular developmental stage. These results are the basis of streaming students entering secondary school into one of three levels of curricula: basic, general, and advanced. These levels serve students

of low, moderate and high ability, respectively.

There are implications for the interpretation of the attainment results for the policy and implementation research reported. When assessing curriculum tailored for students across the range of ability, the expectation is that the assessment addresses the relevance question. The relationship is not straightforward and the following outlines additional aspects of theoretical explanations of low attainment.

2.2 Low Attainment or Failure Paradigms: Issues of Relevance and Control

According to Johnston et al. (1991), low attainment or failure paradigms are of three theoretical orientations, each of which produces different assumptions which, in turn, govern prediction, assessment and intervention in education. The three orientations are child deficit, environment deficit and ecological deficit. However, the students of interest can fall outside these subsystems even when they have attained the criteria of the learning task due to norm referencing of tasks by age or grade.

The first, child deficit, holds that failure is within the physical body or physiologically based (Goby and Sullivan, cited in G. Johnston et al., 1991). In other words, it is the result of the child's innate cognitive ability, along with other behavioural, sensory, motor, linguistic, medical and physical characteristics (Salvia and Ysseldyke, 1988; Speece and Cooper, 1990, cited in G. Johnston et al., 1991). Consequently, interventions and prevention intended to redress some aspect of the child's learning are in the form of the curriculum and evaluation methods. The main interventionist strategies are in the special-needs and learning-support subsystems in Scotland and Ontario education to students with these needs.

The second deficit relates to the educational or learning environment. It includes theories of behaviourism that include learned behaviours, in part grounded in relationships and corrected by rewarding the desired behaviour (Shwartz and Johnston, cited by Johnston, 1991). In addition, in describing this deficit, Johnston includes teacher-student and parent-school relationships as well as socio-economic variables and physical setting to demonstrate the paradigm. The research of Rutter et al. (1979) and J. Chubb and T. Moe (1990) suggests that teachers control

the interaction between the student behaviour and attainment. Chubb and Moe also suggest that inadequate definitions of programmes for that student group result in low attainment. Indeed, the teacher does in part determine the programme provided for the student. With this in mind, the interviews and questionnaire of this thesis explore the teachers' understandings of attainments.

Third, there is an ecological theory that embraces all matter, living and non-living, which is in constant interaction and adjustment, one to the other. For example, a student's response to allergens in the environment may influence his or her learning. Hence, student-environment interactions become a focus (Apter, 1982; Apter and Conley, 1984; Evans, Evans and Gable, 1989; Fedoruk, 1984 cited by G. Johnston, 1991). The policy initiatives in both education systems did indicate a wider understanding of the employment environment into which the student will move. The importance of this paradigm is that it speaks to the conditions under which students can learn (Wilson and Lipson, 1986, cited in G. Johnston, 1991).

Johnston (1991), who argues that the three approaches may overlap, presents them in a model as corners on a triangle, thereby acknowledging that some aspects of learning reside in the student while others reside within the education relationships and the total environment (or ecology). This holistic approach is useful in defining the conflicts around student achievement by accounting for all possible factors and not only relying on the objective or subjective teacher recommendation (Johnston and Fedoruk, in press). Johnston's approach acknowledges as one factor the relevance of student learning needs. The question of relevance regarding the technical initiatives formed within the idea of an effective school and its organisation in Johnston's model (op. cit.) concerns the environment in which learning takes place.

The criticism of this theory from an educational perspective is that it does not have a large-system perspective. The theory accounts for the individual's response to learning. It may be argued that when the system protects the interests of the individual then it serves the public interests. For accountability purposes, both locations have chosen other approaches as shall be discussed.

There may be no single optimal style of learning. D. Hunt (1971)

suggests that different students require different teaching methods; in fact, a student may be at a different stage in each subject. Rates of development seen along a continuum indicate that each learning activity present a range of specific skills. Certainly, the connection between developmental stages and learning is an important consideration, given the demands of the technology curriculum on students at varying stages and with different learning styles.

The wording in each policy uses references to the 'world of work' an ideal setting in which to present the basic skills or learning activities based on the above approaches. The more popularised versions of learning styles that teachers use for planning lessons or learning activities, such as H. Gardener's Seven Intelligences or McCarthy's 4MAT approach, lend themselves to the workplace considerations.

Above all, the learning-styles theory makes a valuable contribution to my argument because it recognises how to approach even the traditional academic skills that are based mainly in reading and writing. Thus we have an education practice to address 'across the ability range' based on concrete practical learning activities. This can describe the learn-by-doing approach as well. Research on successful learning activities for different students assists with the designing of curriculum and encourages success, but this form of research is underdeveloped.

In Ontario, teachers in providing learning activities with follow-up evaluation must consider the learning styles of all students. Generally, a teacher would provide alternative activities described as learning units, or in the Scottish case, modules, to move a student along the continuum if that student did not have the skill required for the current classroom activity. This aspect of the interactive nature of the classroom places high demands on the teacher. For a teacher to provide a variety of learning activities in response to the students' needs requires a high conceptual level (D. Hunt, 1971). This trend demands intelligent planning from the classroom teacher (MET, 1991).

In their research on classroom learning, J. G. Brooks and M. Brooks (1993) suggest that the education paradigm has shifted to constructivist teaching. In this model, the learner internalises information and then reshapes or transforms it. Students do not simply memorise information and repeat it back to the teacher. Problem solving, concept development

and learner-generated solutions are now the focus of learning. The student is engaged in the learning and is expected to interact, reflect and develop constructs. In the constructivist understanding of the purpose of schooling, the learning is relevant to the students' understanding. Since the term relevance is one of the aims of the technology curriculum in Scotland, the respondents' understanding of relevant programmes for students' learning is of interest to my hypothesis.

2.3 Effective Schools and Their Organisation

The debate about whether schools can make a difference on attainments for students is still going on. What schools do and what they provide to students continue to be of interest. The study by M. Rutter et al. (1979), discussed below, reflected this interest, and reflects the environmental approach found in Johnston's (1991) theory. Though it does not examine the content of learning, the study does introduce the relevance of the environment in which learning occurs as it relates to attainments.

According to H. M. Levin et al. (1991), effective schools generally are those that improve the attainment of marginalised or disadvantaged students. Other groups of students would usually be successful in any case. Effective-schools research in the United Kingdom began with the study by M. Rutter et al. (1979) of secondary school teachers, classes, parents and students. In part, their study related home influences and home-school relationships to test results. It concluded that there could be improvement of test results, regardless of socio-economic background. In the classroom, for example, group management was reported to increase effectiveness, as did high teacher expectation, consistent values and standards held up by the school, positive modelling, immediate feedback to students on their performance and finally, and perhaps most important, student acceptance of the school norms. The expectations for low attaining students by the teachers and the systems have wide implications relevant to my argument.

Educators have been aware of another factor regarding expectations since the description of the 'Rosenthal effect', (Rosenthal, R. and L. Jacobson, L., 1968; Isaac, S. and Michael, M., 1981) that is, the influence of teachers' expectations on student attainments. Yet, in the programming and evaluation processes of each system tend to overlook

this factor. Historically, the primary focus in each system we are examining has been on the high-attaining students because they reflect positively on the teaching and on the school. The remaining student population, according to the research, are less recognised and less is expected of them. Rutter also draws attention to the importance of teachers' expectations.

Meanwhile, the more recent emphasis in international educational research, since the effective schools research, has been on sophisticated statistical methods (Levine et al., 1991; Edmonds, 1979; Brookover and Lazotte, 1979, cited by Levine). In these researchers view, research should concentrate on school improvement, that is, on applying the results of the effective-schools studies to improve student learning. International bodies like the Organisation for Economic Co-operation and Development (OECD) have examined test results for information about test taking. This line of research generated an explosion of new statistical techniques for examining effectiveness of schools from a multi-level perspective (Levine, 1991, citing Goldstein, 1987 and Longford, 1987). But, there has been a backlash against international comparison, which uses taxes in a manner that does not serve the local students. Behind the backlash is the fact that individual countries believe that their competitiveness increases when schools produce more students who have high attainments than other countries.

2.3.1 System-Wide Organisation

System-wide strategies represent a different methodological approach to educational provisions. What is of interest in the reporting by J.Chubb and T. Moe (1990) is their view of the technical vocational stream across individual schools in America. Their study illustrates that influences on different streams occur in a variety of ways by school structural and organisational factors. Chubb and Moe (ibid.) used a regression model of surveying and a nation-wide sample of 20,000 students, teachers and principals in 500 schools in the United States, to evaluate 220 variables. They constructed indices by standardising the indicators (variables). They found that:

> The maximum influence of school organisation is about two-thirds of a year over the final two years of high school, the minimum influence about half year. (Pp. 139-140)

In other words less than a school year marks the difference between all schools. The study is of interest because of the wide variation in

school systems that were part of this American survey. Both Paterson (undated) and Chubb and Moe (op. cit.) acknowledge the complexity of the demands on schools. Yet, when discussing student achievement, these authors sound a note of caution about developing causal relationships. However, Chubb and Moe (1990) state that the results of their study suggest:

> school organisation is more important than either than either student ability or family SES (socio-economic status) (p. 137)

They compared students according to the curriculum given: academic (defined as more rigorous than the other two tracks), general and vocational. Vocational students in all subjects underperformed whether they were in schools that had high or low performance. In discussing this issue, Chubb and Moe (ibid.) speak to the reciprocal nature between tracking, or streaming, to achievement but do not attempt to untangle them in their study. What are important here are the authors' indicators for a well-organised school. Their finding was similar to that of Rutter et al. (1979), that high expectations of student behaviour does support the learning environment. Differences in attainment varied by subject. None of these researchers suggested why vocational curriculum would have lower attainment across schools and what effect assessment would have on attainment in vocational curricula.

In his evaluation of schools, A. McPherson (1992) argues that in view of the research on school effectiveness, no one recommendation can be proposed. Before evaluating the tests, assessors must make adjustments for the differences between schools and students. McPherson argues that the raw data are useful for identifying the actual student attainments and the activity within the syllabus or curriculum. He regards a solid theoretical basis for assessment with a good indicator system as essential. According to McPherson, a good indicator system is one that provides for a variety of needs and advantages, is simple yet recognises individuality, incorporates change over time, provides stability and improves its validity continually.

S.J. Prais and K. Wagner (1985) look further into school organisation as a factor in student attainment. They begin by drawing attention to the structural arrangements that support the expectation level for the students of interest. The authors deal with the organisation of schools for vocational training in a comparative study of England and Germany.

The authors indicate that the organisational structure of the delivery of technical and vocational education, using Germany as the example, results in higher demands of and attainments by students of the same ability in England. In part, the comparison uses information from the International Education Assessment. Secondly, Prais and Wagner (1985) make a comparison of low-ability students using results from a test given by an education authority in Germany to English students, with particular attention to the:

> middle and lower half of the ability range, from which pupils go on to apprenticeship and vocational training. (p. 54)

They describe the various types of secondary schools a pupil may attend, comprehensive or streamed, depending on the Länd (state or province). They also make the point that the German system selects students based on guidance to parents in the fourth year of primary school. Although at first glance this is very deterministic, a student may repeat the year, and in theory students may move between tracks if their marks are above 70 per cent (B. Davies, 1991). However, Davies also reports that there is little student movement between tracks (ibid.). When describing this system, B. Connors and K. Sweeney (1990) note that the German state vocational training system co-operates with the Chamber of Industry and Commerce and the Craft Chambers. The dual system of part-time education and on-the-job-training makes up approximately 17 per cent of the German education system. Certification recognises these students at the bottom of the attainment spectrum, and employers accept the certification for employment. The high performance of the economy is an argument that supports the employment of these students.

Prais and Wagner (1985) state that the vocational student group is from the middle and lower half of the student population, that is students who may have similar ability to the students of interest, and the school organisation encourages their attainments. According to J.P. Paul (1991), 437 training occupations are available to them, and fewer than 5 per cent of trainees withdraw. The attainment of school certification achieved by these students prepares them for self-sufficiency.

Meanwhile, in the UK, technical and vocational education has tended to be on offer in secondary schools with a selection system for students who may continue on to post-secondary education. Typically, the attraction for the low-performing student is to the possibility of trade

training. Those with low attainment leave school legally as early as age 16. By the 1980s, England offered a National Curriculum in an attempt to expose students to a vocational curriculum and maintain them in school.

The important issue for our purposes is that the education systems have expectations of attainment for all the students. Such system-wide expectations reinforce the conclusion of the Rutter study (1979) which indicated that at the classroom level the teacher's expectations were an important determinant of students' attainments. Furthermore, the expectation of the teacher may very well reflect the education system's attainment goals for its students. The certification provides meaning for the students. For vocational education there can be a direct relationship between the demands of the learning activities and some future level of occupational application. Raffe (1984, 1988) observes that no direct relationship is obvious between the Scottish educational or academic tasks required and students' life circumstances, either in the present or for their future.

Certification leading to employment is one of the main interests of the initiatives in both Scotland and Ontario. This interest is the response to the problem of youth unemployment. Moreover, lack of work-related certification is, in part, what the recent policy changes in Scotland tried to address. The current attainment of certification identifies underlying assumptions about how accommodation of ability relates to access to certification. It can be argued that when the vocational content is reinforced by learning-by-doing, thus providing the needed skill repetition, that method contributes greatly to successful attainments.

The common thread in the research discussed centres on the expectations for student attainment on the part of the teachers, which the organisation of the curriculum embodies. This research will examine the expectations of low attaining students in Scotland and Ontario by the variety of data gathering methods.

2.3.2 School Resources

The literature on the subject of attainments deals with factors that positively influence learning and, therefore, educational policy and implementation outcomes. The first level of support is funding. Access to funding is a major factor in gaining entry to the school systems,

according to M. Fullan (1984). Writing on change theory and implementation, he quotes the Rand Change Agent research:

> beyond much doubt...the availability of resources external to the districts is a powerful stimulant for adoption. (T)his factor intersects with problem-solving and bureaucratic factors (factors 9 and 10 below) to produce two quite different patterns, which they label "problem- solving" and "opportunistic".(p. 49)

Given that there is an established amount of funding going to schools, options on its use exist. Often assumptions regarding the current budgets are that they are fixed and submissions for changes assume requests for new money. Usually there are personnel in place responsible for the functions covered in the proposals, such as curriculum implementation and they sit on committees for that purpose and can make changes. Though Fullan does raise the issue of meaning in the change process and the imposition of change, he reports numerous research results in an impartial manner without attention to the overriding issue of the value and purpose of the education reform.

Chubb and Moe (1990) used average expenditures per pupil to measure school funding. Expenditures varied with school taxes, and so there were differences in programmes and staffing levels. However, Chubb and Moe's (1990) position is that encouraging student behaviours that improves the learning environment can enhance student attainment, even in low-funded areas. This behaviour would include coming to school prepared and willing to learn. The students' attitudes towards school are also an influence that Bell (1988) identified in his study of the TVEI.

While funding in the Scottish and Ontario initiatives introduced change to the system, access to the curriculum and interest in technical and vocational education for all ability ranges, the question remains: Does funding ensure an organisational response that provides for the attainment of all? To gain funding, the TVEI criteria introduced evaluation that included the context of the learning environment. These factors relate to student characteristics and forms of teaching that influence attainments.

2.4 TVEI Literature Review and Research Evaluations

Reaction to MSC's new approach was immediate. R. Dale's position (1985) is that the UK initiative not only is providing training for jobs but for a status of work and non-work or reinforcing the class system. Given

the nature of the labour market, according to Ashton (1990) this relationship is not direct, since those students who leave school at 16 do appear to get jobs as compared to those who stay in school. Regardless, the new vocationalism, according to Dale (1985), legitimises inequalities based in class biases and helps employers by assisting in capital accumulation. He is concerned with the way in which the government carried out this policy as well.

Chitty (1989) is another author raising concerns about the new vocationalism. He believes are that early streaming reduces life choices, replaces schooling with training in mindless tasks and diminishes the role of the education Authorities and comprehensive schools with its utilitarian approach. Chitty indicates that the distinction between education and training is becoming blurred in this initiative, he strongly emphasises that that is not for all because the system divides at 14, 'hiving off' the non-academic students. He argues for the broad balanced and non-segregated curriculum without premature selection. In addition he raises the alarm about the move to centralist control of education by the government but suggests that support for the comprehensive school and the democratic tradition will overcome these changes.

G. McCulloch (1991) takes a somewhat different tack. He argues that traditionally the British education has been hostile to industry and careers. According to him, the tension is between the need of secondary schools to prepare workers and to provide proper values, curriculum and orientation. The suggestion is that the latter type of curriculum prepares for professions and the former for the trades. He does support the previous two authors' concerns about the right-wing control of education for the purpose of serving the needs of the labour market and the economy.

It is ironic that the writers on the left are objecting to a stronger presence in secondary schools of an initiative that clearly favours the work ethic. They have all supported a discussion that makes the argument for a liberal education, but unfortunately the positions do not appear to discuss the balanced curriculum or provisions for both a liberal education and vocationalism.

Addressing some positive aspects of the TVEI from an educator's

perspective, R. Pring (1985) maintains that education must reflect wider social values that embody the society's social conditions and problems. He suggests that liberal views are embedded in educational practices and that constant questioning and reformulating is necessary. He claims there are two kinds of social influences on educational practice, those that have an effect on personal growth and those that promote the utility of education. Pring argues that the TVEI has forced a reconsideration of teaching methods, which have become more practical and experiential. Those two methodologies do address the concrete learning needs of the age group identified in the literature. The TVEI altered the role of assessment, provided for more equal opportunity among students, gave the schools more autonomy and increased the use of technology. Pring (1985) sees the changes as providing students with more general capacities of the mind, appropriate attitudes and ability to adapt to the technical base of industry. He believes that students will consider their circumstances beyond age 18 and perhaps postpone school leaving and be better prepared to earn their living. Because the future is uncertain, he thinks they will require more technology skills and personnel qualities, particularly an introduction to moral traditions as technology increases the information and communication exchanges. Pring concludes by insisting that thinking of liberal and vocational education as separate creates a false dualism. The TVEI offers a challenge to practice, he argues, which serves a wider social function.

C. Howieson (1989) focuses on the Scottish issues that arise from the wider acceptance of comprehensive schools and the opposition of teachers to the new initiatives. She does speak positively of the new management structure, accountability, the modular courses and the TVEI in the mainstream as compared to England and Wales. As the personal development of students as well as technological skills are attended to, there is less opposition to the approach. One problem Howieson notes is that the TVEI being associated with low attainers, in part because of the courses aimed at the higher attaining students.

Howieson (ibid.) indicates that the fears attached to the TVEI were unfounded. It is unclear if the warnings by other authors were the reason for the development of broad curricula that included personal development. She does acknowledge and support Bell's observations (1988) of the difficulties of schools and industry working together.

The relationship of the MSC's training schemes to employment has received a variety of criticisms. The major one is that there are no jobs at the end of the training (Finn, D., 1987) for a large number of those seeking work. In Scotland the unemployed numbered about 80,000 in the early 1980s (Stafford, A., 1989). Of that number fewer than a third were in a training programme. The MSC's response to high youth unemployment, according to Howieson (1989), was not training but education. This served to keep students off the labour market at the same time as improving their employability with an increase in skills. Whether these skills resulted in employment is questionable since there are no studies relating one to the other, although the following authors imply that computing skills are in demand.

The TVEI courses that had wide appeal were computer courses. T. Conlon and P. Cope (1989) criticise the SED's original introduction of computers to the curriculum. They argue the start-up problems were due to bureaucratic conservatism and poor direction, in part because of the lack of debate, scrutiny and criticism. There is some consideration of the fact that the introduction of computers intrinsically had new and different problems. They are more supportive of the MSC's expedient approach in that it was directed by teachers and is not top down like the SED's implementation. They indicate the TVEI's in-service training was responsible for smooth implementation as is the support given directly to teachers of all subjects and not just those of computer studies.

The authors address issues of computer mediated-communication and the fact that instrumentation does alter orientation because it involves something different. The fact that computer courses are part of every TVEI project meant they were primarily vocational. This limited the content to what is described as the 'machine operator' level rather than the widespread approach of computers across the curricula (Conlon, 1989).

The parallel developments of MSC's and SED's courses allow for a comparison of Standard Grade and the TVEI courses because both remained at the operative level and did not include 'high tech' approaches that may be more appropriate for the higher-attaining students. The future for widespread acceptance of distance education or non-classroom-based

schooling remains a question on the horizon as the National Grid for Learning establishes Information Technology across Scotland (SEED, 2000).

Some of the reasons for the acceptability level of TVEI are provided by M. Saunders and D. Halpin (1990) and P. Ainley and M. Corney (1990). Their criticisms of the MSC training are that teachers and co-ordinators redefined and reconstructed the TVEI, which meant that the skill range is too narrow and the tasks for developing competencies are isolated. The government's targets offset the changes in methods of teaching and styles of pupil learning. Employers retained their tradition of not investing in training and the unions feared the technologies and retained their trades and apprenticeships. Education assisted the entrenchment of these positions by moving back to the grammar school model in 1988 in Britain. Education in Scotland having developed new vocational structures and relationships with vocational committees retained the new educational methods and continued negotiating changes into the 1990's.

The MSC (1982) mandated the TVEI research evaluations as part of its contracts with the Authorities. The reports provide more specific information regarding the impact of the TVEI.

One of the theoretical approaches by which schools and TVEI policy were evaluated in Scotland is based on a regression statistical model reported by L. Paterson (undated, unpublished paper) in 'Local Variations in the Scottish pilot projects of the Technical and Vocational Education Initiative'. He uses data from Scotland's school leavers' survey. This mailed survey was conducted every two years with a random sample of about 10 per cent of Scottish young people, chosen by birth dates and sampled in the spring of the year in which school leaving is allowed. For this research, 100 per cent of the TVEI school students were included in a comparison across schools. In each of the 27 schools in TVEI projects, about 200-250 students were involved, generally in the 14- (third year of secondary school) to 16-year old age range.

The five indicators used for this evaluation were attainment in public examinations, balance of curriculum, commitment to education (staying on), the employment prospects of school leavers and gender equity.

Paterson (ibid. quoting Thorpe and Black, 1987) notes that students in the TVEI had lower than average academic potential. Her Majesty's Inspectorate (HMI) (1991) reported that students with higher than average academic potential were the majority of students in two projects, whereas low potential characterised the other three projects, resulting in the overall below-average observation by Paterson. This does not necessarily accurately reflect the classes or schools as a whole in Scotland as much as it reflects the 'catchment' areas of the specific schools (HMI, ibid.). Three projects included special-needs students; one of these had two entire schools with learning difficulties and one hearing-impaired unit. Because data were available before the initiative, Paterson's evaluation took into account changes in student outcomes over time as an indicator of the TVEI's success. In addition, his evaluation includes the relevance of the curricula based on five indicators.

In his report, Paterson (undated paper) observes:

> on average the TVEI had very little effect on any of the outcomes. (p. 12)

Because of taking a TVEI subject, the TVEI students dropped a higher award. In the first five projects, student attainment in English and mathematics was 'harmed'. No effect turned up in two later projects. The TVEI students had a rise in attainment in comparison to students not taking TVEI. Paterson suggested that this is a result of the types of subjects attempted by each group and the interaction with the number of subjects taken. While there was no report of attainment by ability group, he noted some general positive indications of the curricula. In the case of some of the schools in the survey, the effect of staying on was not as evident as the aims of the initiative had hoped. By encouraging students to try examinations, staying on was increased by other schools in the sample, but not enough to result in greater certification overall. For employment and training, there was an initial rise but then a decline across schools. As for overall attainment, the net variation across schools between the so-called 'best' and 'worst' schools was two 'O' grades. Paterson (undated) attributes this variation in attainments among the schools to the number of attempts; however, it also may be because of a sampling error. As for the gender issue, Paterson reports that the TVEI did appear to provide for equal opportunity. Regarding social class, the TVEI appeared to benefit

working-class students.

Paterson (ibid.) urges caution in accepting the conclusions of the analysis because of the influence of one exceptional school given the small sample size as this comparison is across schools, the influence of the 'Hawthorne' effect (the effect of being the subject of research) and the funding for resources.

There was no reference in this study to the actual range of student ability, other than Paterson's comment:

> The TVEI schools had below-average attainment in Ordinary (0) or Standard (S) grade (p. 13)

If advice to students who are likely to fail is not to try examinations, the results would be biased. The assessment retains its reliance on written work and not the practical demonstration of a skill with in the overall curriculum, although the TVEI modules do provide teacher-assessed practical projects as part of the student evaluation. There is great variation across schools both in the demands expected of students and the actual classroom curriculum, which is the basis of assessment. Paterson does recommend more research in the form of case studies and statistical analysis to explore the diversity between schools.

Meanwhile, other Scottish evaluation reports of the TVEI indicate positive aspects for students. As the TVEI was an innovation for the total student population, the literature gives an overall picture of the results without a delineation of ability groups. This illustrates a gap in the evaluations, given the reference in the policy statement to 'across the ability range'.

Though Patterson's research provides a view of the initial projects, his results may reflect the start-up problems of the initiative. It is unclear whether those were resolved by the TVEI extension. The reports of the low attaining students response may not include attempts to teach them skills that would be of direct use in the workplace such as those needed by a chef's assisstant.

L. Croxford et al. (1991) re-examined the same young people's data as Paterson (undated) to determine the module experience across the range of placements. Croxford's research includes secondary schools as well as

on-the-job training, Youth Training Scheme (YTS) and Further Education. The Croxford study deals with the modular system of education introduced by the MSC's funding mechanism of the TVEI. The new perspective gained is with using the completed module, rather than enrolments as a measure.

The findings of Croxford et al. (1991) are as follows: selection of modules by 59 per cent of the fourth-year cohort with increases in staying on at school and movement occurring between statuses. Completions by all groups were similar, at about 60 per cent. Many transitions after secondary school were to another level of training. For low attainers and females, there is an increase in enrolment in modules. Croxford et al. (ibid.) caution that the implementation of the *ACTION PLAN*, another education policy attempting school improvements for 16- to 18-year-olds, which overlapped with the TVEI, made it difficult to attribute the results to the TVEI, one aspect of the new 'institutional versatility'. The importance of their study is that it speaks specifically to the issue of attainment as distinct from enrolment and non-attainment for the low attaining foundation student, but with their above-noted caution.

The Croxford study makes an important contribution by shifting the evaluations from enrolments to completions. This shift marks an improvement in the concept of relevant indicators. Since enrolments are the basis of school funding, schools are naturally interested in them. The truancy rate or withdrawals from a course do not affect funding, so the system has less interest in these indicators even though they reflect the perspective of the students and are an indirect measure of their satisfaction. Truancy remains a concern because of the mandatory attendance requirements. If the reasons for truancy and non-attainment are examined, the results of the curriculum contribution to attainment could be more easily accepted. Because this study was of the early experience of the TVEI, it does not account for later developments as the community adjusted to the changes it supported.

L. Beck and H. Black (1988) surveyed 74 per cent of the intake in one project as to the TVEI's aims related to qualifications, application to real-work technology, assessment, pace and level of work, job opportunities and independence. Students generally were favourable about the initiative and the learning activities it presented. The authors concluded that, generally, schools met the TVEI aims. They did not

address the aim of 'across the ability range', non-attainment and effects on employment.

Another study by Beck and Black (1987) focused on the views of key personnel toward the initiative and the changes it introduced. The topics discussed in interviews with the participating teachers were what is good practice, aspects worth replicating, major difficulties, aspects of ideas that failed and those aspects that were lasting. Beck and Black found that funding is an important issue for educators, who hold the opinion that more is required. The funding provided for personnel who developed the learning materials such as the modules. The modules are the focus of the initiative and are important to teachers because they are the source of their instruction. This study does not discuss outcomes related to certification of students, and like most of the Scottish research, concludes that failure to attain is the responsibility of the student.

The work-experience component of the initiative is the focus of study by H. Malcolm and H. Johnstone (1991). Students (699), employers (40), teachers and work-experience organisers (151) and career officers (18) are evaluated in this local research. There are positive comments on work experience, and the authors who expect extension across schools made recommendations for improvements and adjustments. But Malcolm and Johnstone did not research the effect of work experience for different ability groups; this is a gap in the reporting. The relationship of work experience to students' career aspirations are issues that the authors did not discuss.

To finalise this section on the TVEI evaluation, is the summative evaluation for the Scottish Yearbook made by C. Bell et al. (1989). Two themes were identified by the authors. They claim the tensions, contradictions and outcomes were different in Scotland from England's. The two distinctive features of the TVEI in Scotland were the enhancement of subjects across the curriculum and student negotiations of subjects, which gave them more control of and responsibility for, their education.

These features made the TVEI more acceptable to students but did not give them certification that had more value on the labour market. The questionnaire will examine the educational problems that influence the

curriculum provided in schools.

2.5 Indicators Based on School Leavers

Unlike Scotland, Ontario takes a different approach to the issues in that it provides technical education in which there are courses designed with the student's ability in mind. The fundamental question for Ontario research is the withdrawal of students without certification. The most represented group of school leavers is low attaining students. Studies of school leavers in Scotland have a substantively different focus from those in Ontario. In Scotland, the studies are of students after they had made the decision to leave school, and the research focuses in part on reported destinations after leaving. Why would a student leave school with neither certification nor adequate skills for employment? The literature reviewed uses Ontario research to attempt to answer that question.

In Ontario, annual enrolment data is available through the MET, but no information is kept on leavers. The research of A. King et al. (1988, 1989) identified indicators of why a student may be an early school leaver. Like P. Quirouette et al. (1990), King takes the view of attempting to retain students. These authors' approach is in line with Johnston's (1991) environmental-failure theory in relation to failure to attain. A questionnaire given to grade 9 students identified the following indicators that a student may leave school (Quirouette, 1990): feelings of isolation, future education plans, difficulties with school work, self-confidence, absenteeism, need for help from teachers and interest in school. Boys had slightly higher dropout (leaving) rates than girls, and English-speaking students' rate (34 per cent) was slightly higher than French-speaking students but this was not thought to be statistically significant (ibid.).

The Ontario survey found that the largest group of potential school leavers was in the basic level, at 53 per cent (Fullan, 1992). Meanwhile, the provincial enrolment statistics by streamed level in grade 9 was basic, 8 per cent; general, 52 per cent; and advanced, 40 per cent (King, 1988). According to King (1988, 1989), school enrolment statistics show an over-representation of basic-level students leaving school without certification. Generally, school leavers were more likely to be those who did not find schooling a rewarding experience. Moreover, King et al. (1988, 1989) identified a number of characteristics

correlated with leaving school before graduating:

> a dislike of school, poor grades, failure in courses, erratic attendance, pregnancy, discipline problems resulting in suspension or expulsion, low socio-economic status, no father in the home, and frequent changing of schools. (p. 3)

Citing Hildebrand (1986) in categorising these identifiers, King suggests either that the student has some control over the situation, as in the first six instances, or that the student has no control over the situation, as in the last three.

In contrast, American research (Johnston, 1991) focused on the history of failure in school and raised the question of whether failure is a primary or secondary characteristic. Johnston infers that ability is the determinant. King et al. (1988, 1989) raise the issue of trying to understand how students manage a process that requires some students to be more successful than others are or guarantees a lower status to some students. Both researchers advocate programmes to address the conditions for leaving school and to address career opportunities for secondary school graduates and non-graduates. King also raises the question of why the education system would want to retain students to graduation when no integration occurs with later careers. One obvious response is the relationship of enrolments to funding and staffing, which is an indication of the system's self-serving nature and neglect of the interests of some students.

On the subject of school leavers, D. Stern et al. (1986), like D. Ashton et al. (1990), indicate that educational expectations among employers have risen and that secondary schooling is no longer adequate for most jobs. The implication of these studies for low attaining students is that additional preparation is required before leaving school. The attainment issue is significant in societies that have a surplus educated workforce and in a global economy where other countries have less expensive labour forces. Ashton (ibid.) contends that low attainers need separate consideration to ensure a positive transition from secondary school. The study on retention suggests ways of addressing this question.

2.6 Ontario Interventions

In their study of annual enrolment patterns across cohorts, King et al.

(1988, 1989) suggest the use of intervention strategies once students at risk of leaving have been identified. Individual counselling, mentoring by staff and peers and group counselling were suggested because they were neither costly nor time-consuming and were easily integrated into the school organisation. Less frequent interventions included in-service training on learning styles for teachers, efforts to encourage greater parental involvement, co-operative education programmes, learning assistants (teachers' aides) from out side the school and reviews of curriculum for its appropriateness. King discusses the bias of schools in favour of the minority of students who go on to post-secondary schooling. There is a systematic failure to promote the social and financial rewards of a high school diploma for the remaining students. Though there is no one solution to low attainment, an important factor to keeping students in school is a genuine positive relationship with an adult.

In Ontario, for the basic level programme, King et al. (1988, 1989) estimated student retention at 30 per cent. Some of those students were presented to a special education committee, the Identification, Placement and Review Committee (IPRC) to be formally designated as basic level. Practices vary widely; some schools have a selection procedure for basic that designates all students as needing special-education; others rely only on the elementary schools' recommendation. In some debates on schooling, it is argued that the school must show cause if it recommends removing a student from the main stream. The few segregated vocational schools had better retention rates and more effective programmes and were more student-centred; that is they had a career focus that provided work experience in senior grades (King et al., 1988, 1989). The results with these student argue in favour of streaming students for programmes. Evaluations of these students emphasised attendance, work ethic, general attitude and involvement. Counselling and remedial services are also necessary.

King et al. (ibid.) also concluded that the rate of school dropouts is a function of job opportunities and economic growth, a similar observation to the one made by Ashton et al. (1990). There are perhaps more social and economic costs, the need to control of high-risk behaviour of young people and reduction of the labour pool when job opportunities are fewer. As projections of the demand for unskilled labour show a decline plans need to be made to prevent social disruptions and to provide for

the unemployed. Among some of the successful practices identified by King et al. (1988, 1989) are extracurricular programmes at the basic level with a focus on fashion, rock music and cars to encourage students' successful involvement with the school.

King (ibid.) studied the level of courses being taken by dropouts at the first year of secondary school and at the time they left. He makes two observations: first, basic level students who take two or more technological courses are more likely to drop out than those who take fewer than two or who take business courses; and second, the decision to take a number of technological courses is made after failing a number of academic courses. This latter point identifies the beginning of school leaving or an early indicator to the system that a student is at risk. It is unclear what these early indicators mean.

P. Quirouette et al. (1990) made the following recommendations to schools for identifying probable early school leavers:

1. Sensitise educators to the particular problems of potential school leavers.
2. Involve school administrators and teachers in an analysis of school data.
3. Implement intervention strategies with the goal of meeting special needs.

Some of these specific needs of students that require attention are beyond the schools' resources and current mandate. Nevertheless, schools could be encouraged to join with other community groups that provide services to youth and their families.

To further improve the staying-on rates of students, D. Elkind (1981, reprinted by O. Wright, 1983), observes:

> The most efficient learning takes place when there is a match between the level of reasoning demanded by the curriculum material and the stage of the student's thought structure. (p. 19)

Therefore, to be relevant, there must be a relationship between learning activities and intellectual experience. These indicators require teachers to have skills in assessing students' responses to learning materials (D. Hunt, 1974). In addition, a classroom teacher needs to clarify whether students who are having difficulty with the programme are special needs or low ability. Generally most students do not have access to individual assessments. The questionnaire addresses these

assessment issues.

In summary, schools have organisational approaches based in constructs of ability for the presentation of the curriculum and attainment. These structures may confine the attainment possibility of some students.

What is problematic then is the way in which education is structured, particularly for differentiating low attaining students, and how curriculum is determined to be relevant for all students.

CHAPTER 3: A DESCRIPTION OF THE METHODOLOGY

3.1 Introduction

Educational systems traditionally concern themselves primarily with the academic student. Therefore, little information is available regarding the educational experience of low attaining students, other than their failure to attain an academic education. The research gaps are in the area of suitable curriculum based on the educational preferences of these students. Preference here refers not only the students' choices of education experiences but also the methods to which they respond more favourably. To address these gaps this chapter discusses the research objectives and design, including issues of data collection and analysis.

3.2 Research Aims and Objectives

Movement away from the traditional system that rewards only the higher student with recognised certification has been part of the motivation for the Scottish innovation. Ontario has somewhat different interests, since it already served three different streams it changed its method of delivering the curriculum. To determine improvement in students' school experience requires an examination of the schooling they received before the changes. Therefore, the first objective of the research is to describe secondary school and its organisation for low attaining students within the conceptual framework of curriculum, assessments and attainments before the changes.

The second research objective is to answer the question of how the political and professional personnel interpreted the new policies for the low attaining students and whether they developed new structures in response to the policy. Relevant government documents and interviews of personnel involved with implementation may reveal this information.

Examination of the technical initiatives will include the changes that learning-by-doing provides in its organisational context for delivering education linked to the world of work for students. Therefore, the third major objective is to determine the effects of the policy and implementation of each initiative. To address this area of research a questionnaire makes inquiries of those educators at the school level with regard to the structures and functions effected by the new policy.

From the point of view of the least privileged students, the research will examine the effects of any changes at the school level that the three objectives assist in identifying. The following questions categorise the objectives into four specific areas that relate to the functions of teachers in relation to students at the school level:

1. How did the technical co-ordinators or technology directors charged with implementation within the schools plan for the students of interest?
2. What are the in-school policies and procedures in relation to the initiative?
3. How is the curriculum taught to low attaining and non-attaining students?
4. What are the considerations for student promotion?

P. Broadfoot (1979) suggests that little known about teachers' functions. Yet these functions structure the implementation of policy at the school level. Teachers are part of the research because they are the personnel in contact with all students and they have the responsibility for implementing the appropriate curriculum in the classroom as well as for conducting some assessments.

3.3 . Methods: Research Design

The choice of the research methods results from the problem under examination. Given the educational needs of these students the issue in this research is how to examine the technical and vocation education provided to low attaining students within the context of local solutions to policy directions.

Since the research must deal with educators' definition of the policies' direction as well as the student' attainments, the design must address teachers' various functions in the process as well as the results of the changes.

The organisation of the research design is as follows: the rationale for the approach to the research; the selection of research methods; the development of the questionnaire; and the analytic approach.

3.3.1 Approach to the Research

Two major strands of research design are evident. The first, which claims to be scientific, describes the research issue into categories for description. The second acknowledges the difficulty of separating fact from value in research. To benefit from both approaches this research uses both open- ended questions for interviews with educators that inquire into the initiatives and a questionnaire developed for teachers. The problems of teaching practice are intrinsic to understanding the solutions provided. The research design asks educators to identify and measure the changes in practice that reflect the policy change and these educators' responses are the basis of the research design.

A major objective of this research is to describe the technical and vocational initiatives that included the low attaining and to question whether they came to provide the solution to employability. The successes with these students in mixed models of education are not a new solution, as previously noted. Therefore, to put the solutions offered into the new global context to which they are in part responding, comparison is necessarily part of the rational. Furthermore, the design of this thesis as a comparative study allows a wider questioning of the approaches chosen.

Secondary school is the critical stage for students to make educational decisions which are career oriented, and the recent initiatives in both countries provide an opportunity to increase our understanding of the issues involved, how they were resolved and whether any are remaining. The case study of each location uses the qualitative interviews and social survey mentioned above to describe and examine the new policies in relation to low attaining students. The examination provides for the identification and description of the similarities and differences in the organisational structures, resources and personnel associated with the initiatives in each location. The two case studies can then provide for a comparison of the main features and issues and for an examination of future possibilities for continual improvement of these students' secondary schooling.

This comparative case study uses both qualitative and quantitative methods to place the research into a conceptual form to examine technical education. To develop this approach, the theory described in the literature review provides the conceptual means to approach the methodology which includes analysis of policy documents, interviews and a mailed questionnaire.

Classroom visits, while not part of the original research agenda, provide additional information, as do the curriculum documents offered by teachers.

By using this variety of methods, triangulation of the information is possible. As documents provide the official record, the interviews provide the perspective of the personnel who implement the directions of the document into actual practices in the classroom. Because those in positions of responsibility have some discretion, an account of their interpretations of the policies' direction is necessary. Finally, to gain a view of the changes that affect students requires school-level information. This is collected through the use of the questionnaire and a further eight interviews in schools. Thus it is possible to compare the various data sources, thereby increasing the reliability and validity of the data (Yin, 1994).

3.3.2 Selection of the Methods

To ensure identification of the students of interest in Scotland and Ontario, the researcher employed the following methods. The research began with two initial interviews in 1991-1992 with researchers who had conducted some of the evaluations in Scotland for TVEI (Paterson, undated and unpublished; Bell, 1988).

The purpose of these interviews was to explore their research and to inquire whether there had been a focus on the issue of attainments of students 'across the ability range'. The interviews were to be open-ended, and the explanation given to the researchers was that the research interest is on low attaining and non-attaining students within the TVEI. The development of a comparative research approach seeks to determine whether the technical and vocational education initiatives improved student attainment across the ability range.

Eight interviews in each location in 1991-1992 sought to identify how senior government and Board or Authority personnel interpreted across the ability range and low ability. This means not only identifying their theoretical approach but also their intentions for changes in practice.

A mailed questionnaire was used to examine the implementation of the initiatives; the questionnaire seeks information from teachers at the classroom level (see section 3.3.3). The information collected attempts to identify changes in functions or practices devised for the low attaining student.

To clarify classroom practices, eight additional interviews were held at the school level in each location after the questionnaire data gathering was completed in 1993 (see also Note).

The research includes a number of classroom visits in each system, which the teachers offered in addition to their interview. Some interviewees also offered curriculum documents during the interviews.

3.3.3 Development of Questionnaire Design

To trace the influence of policy changes on teachers' functions, as one aspect of the questionnaire, the four teacher functions that relate to students were identified with the assistance of the literature and interviews: planning, school policy, curricula programme and promotion. Administrators, two each from an Authority and a Board, assisted in the questionnaire development. The questionnaire design for use in each location accommodates local differences in terminology.

The second function of the questionnaire was to determine the number and nature of low attaining students acknowledged to be part of the technical education initiative at the school level. With the new policy for criterion-referenced examinations in Scotland, the expectation of the aggregate national data was to find just less than a third of all students assigned to this group in Scotland (Dunning, 1977). Ontario research indicated that as few as 7 per cent, or 8 per cent of secondary school students (M.Fullan, 1992; King et al, 1988,89;) take courses at the basic level. The aggregate data could guide the education decisions that could provide certification of work skills for these students. Low attaining and non-attaining students may not be protected by special-

needs provisions in either system, and may therefore be considered as the least privileged.

The mailed questionnaire, which was pre-tested with the assistance of the Authority and Board administrators in the fall of 1992, samples implementation ten years after the policy announcement and five years after extension. The development of the questions was the result of interviews and suggestions from senior personnel. Pre-testing in the fall of 1992 involved a sample of Authority- and Board-level interviewees who were responsible for implementation. A letter sent to the directors requested consent to mail the questionnaire to the to Authorities' schools. The plan for the questionnaire mail-out was for the spring of 1993, and a follow-up reminder to non-respondents was sent a month later. The selection of the random sample of respondents was from the official school lists of each location. The second group of interviews, eight in each country with school technical teachers, clarified the questionnaire responses for the researcher.

3.4 Access

For confidentiality reasons, a formal letter is the required protocol for interviewing staff in Scotland and, as such, a consent letter was developed (see Appendix A). Some of the information requested from the Education Authorities is maintained by the schools. The letter requested the consent of the Education Director of the local Authority to contact personnel for the information; it also ensured protection of the identity of the Authority and the school in the report. During this time, league tables, which publish school examination results, became available for the first time. Scottish schools are sensitive to the publicity concerning their results, and this influenced the willingness of teachers to provide the information. At the time of the interviews, current job action resulted in some teachers' decisions not to release the information.

In Ontario, no authorisation is required from either MET or the teachers at various Boards in order to conduct research. Teachers are independent professionals and, as such, can choose whether to respond to interviews or questionnaires. It is not an assigned duty. In Ontario, unions have expressed concern about holding the subject teacher accountable for attainment, given the many variables affecting this issue. There was no confidentiality risk seen for the participants, because there was

provision for their anonymity. An introductory letter on the questionnaire, similar to the one addressed to the Director, explained the interest in conducting the research.

3.5 Analytic Approach

To compare the two systems, this comparative analysis required identification of a common core in each policy. Whitmore's (1984) comparative model includes an exploratory-inquiry approach that identifies that core. In this instance, the common core in the two locations is the policy aimed at providing technical education across the ability range in secondary schools. While this provided a beginning to the examination of each policy one difficulty was the identification of the reference points where common terms and approaches are used; for example, between low attaining and foundation and basic.

On the one hand, in terms of education paradigms, integration of the low attaining students conceptually is part of each technical policy that requires an appropriate curriculum response to these students who have different needs than those of other students. On the other hand, what the school provides or does not provide addresses the needs of the system, the teachers and the other students. To improve the attainments of low attaining students, changes must consider the structures that view them as low attaining and deny them meaningful certification. Furthermore, improvement in their life chances may be possible with certification of schooling that is recognised in the work world. The structural-functionalist comparison focuses on issues of resources, forms of organisation and the delivery personnel (Whitmore, 1984). However, the view of that model is that it is not inclusive enough to cover each policy statement.

Additional criteria from a wider body of literature complete the policy analysis. Among those is Easton's (1965) system model, which identifies more quantifiable inputs such as personnel and resources directed to the policy change, as well as the outputs they produce. While quantifiable information provides some of the information necessary for analysis, another approach is necessary. The qualitative questions surrounding the outcomes, such as improvement in the educational relevance and experience of students need additional examination.

To account for the quality or value base of the policies requires

additional criteria for a fuller discussion of the issues. Those are provided by Gregg's analysis (1976); they examine justice and fairness for the least privileged of the system, their legal capacity, willing consent and the adaptability and stability of the policy, along with its costs and its information-generating and error-correcting features. Each policy's inclusive value base led to the identification of the low- and non-attaining students as those least privileged and assigned to the foundation-level in Scotland or basic level-courses in Ontario.

Analysis of each policy is through the stages proposed by Downey (1988): initiation, creation, analysis, choice and installation. Downey further suggests attention to special interest and elite groups, bargaining and public choice in decision making and resolving issues.

The two types of disciplined inquiry, according to Isaac (1981), of research and evaluation are interrelated in this thesis. Description lends itself to the implementation analysis and policy evaluation. At the same time, evaluation research lends itself to the comparison of the educational approach to a sector of the student population in the two locations. Applying the above combination of theoretical criteria appropriate to description allows for an examination of equity on behalf of the low attaining student.

This research does not assume that low attainment, non-attainment and failure have the same meaning within each system. Co-ordinators were asked about the learning profiles of foundation and basic students in order to determine whether there is a pattern common to both locations based on their own definitions and provisions. The student information provided by the teachers benefits the decision-makers and planners in each system.

The criteria identified the core of each policy (Whitmore, 1984). Each core includes the concept of inclusion, that is, that the full range of students is to benefit from each initiative. This inclusive scope thereby introduces equality of opportunity to the analysis along with equity. The framework addresses the following issues: What are the unmet needs? Does the response address the issues? How practicable are the approaches for implementation? The time dimension captures the policies studied through both development and implementation. This method also provides a way of following the similarities and differences through

implementation to institutionalisation and review in each location.

3.6 The Respondents

Initial interviews in Scotland and Ontario consisted of two government administrators in each location in addition to the researchers C. Bell and L. Paterson and two administrators from the local Authority and Boards. The first group of eight interviews in Scotland inquired into the events leading up to the creation of the initiatives. Because Ontario's initiative was not the subject of research, interviews were with the MET civil servants with responsibility for leading implementation and monitoring the initiative, in addition to the Board Administrators. The first set of interviews took place in the fall of 1991 and the winter of 1992. To arrange for the initial interviews, the researcher telephoned the relevant education official. These calls outlined the focus of interest. An appointment, estimated to take about one hour, was set up.

A second set of eight interviews in each location was then conducted with technical co-ordinators. These interviews, which took place after receipt of the questionnaire results, clarified some of the issues at the school level. The interviewees had classroom-level experience with the initiatives. These interviews were held in the fall of 1993.

3.6.1 Selection of Respondents

The Scottish interviewees were senior personnel involved in the TVEI implementation. They were selected because of their involvement with the initiatives through the pilot phase and extension.

In Ontario, to the extent possible, interviewees held parallel roles to those attached to the TVEI initiative. The personnel who had some similar evaluation responsibility were the MET personnel attached to technical education and responsible for its renewal through the period under study. Thus interviews were conducted with four MET personnel who were part of the committee developing the curriculum initiative. Also selected were four educators at the Board level responsible for implementation in their schools.

These senior educators were able to provide the historical background to the developments in secondary school technical courses for their area. They assisted in the formulation of the policy change by determining the

strategy, seen as a critical factor in the two educational systems.

3.7 Data Collection

To measure the impact of the policy on the schools' technical provisions at the foundation or basic level, data collection methods include the following: document examination, interviews of important personnel, a descriptive policy and implementation analysis using primary and secondary material, selected interviews and the mailed questionnaire.

The questionnaires sent to the school TVEI co-ordinators in Scotland and the department heads in Ontario provide information in a non-intrusive manner. The focus on low attainment in technical courses is the method of determining the policy and implementation impact on the least privileged. At the same time, personnel are able to make suggestions regarding school practice. This method is an inexpensive way of gathering information on the target group (Frey, 1989). The degree of control by school personnel over implementation is of interest and subject to debate. The data collected on the four functions define the relevance of the initiative in schools.

The selection of these functions is somewhat arbitrary. For example, school personnel may function at two levels in curriculum programme planning, that is, at the broad, system-wide or school-wide level or in the classroom with the current group of students.

The following four sections of the questionnaire generate quantitative data: one, the in-school planning that effects low attaining students; two, the school policies and procedures defining the school environment; three, the programmes provided with a focus on low attaining students; and four, the promotion practices in the school.

3.7.1 Policy Documents

Document collection in each location varied, depending on the government approach to policy change. The official policy statements had similar origins, that is, in a government announcement. In the UK, a political statement was followed by an official MSC request (see writ in Appendix B) for funded project submissions. In Ontario, the official policy document (see Appendix C) is a curriculum guideline for implementation by all Boards followed by a funding application for equipment renewal. No legislation was required in either location other than what was required for the financial allocation to the initiatives.

The negotiations for funding are a critical area and the least visibly documented. The classroom curriculum materials, which are a result of funding decisions, are readily available and were provided. Observation of the actual curriculum implementation occurred in some of the school visits. Identification of the similarities and differences between the official policy and practice occurs through comparison of these approaches and documents.

3.7.2 Preliminary Interviews

In the preliminary interview, discussion with L. Paterson examined the dimensions of the school leaver research. The research included, during this period, evaluation of students enrolled in the TVEI courses. It focused on the reasons students left school and represented all ability levels. The discussion explored the role of the Scottish Office in contracting research and its interests in the data. Also discussed were some equality aspects of this research.

C. Bell, the second researcher interviewed, focused on the experiences related to the part of the aim that involved industry. Bell's impression of the schools' views of local industry was explored, as was the employers' framing of their needs in relation to secondary students, their hiring experience and their interests in the higher-attaining students.

The next interviewees consisted of the SED, the MET, the Authorities' and the Boards' personnel who had administrative functions in implementation. They were able to provide the background to the decisions, the strategies chosen and the issues and problems encountered from a system-wide perspective.

In Ontario, as no primary external research exists on the initiative, the substitutes selected are two MET staff with province-wide responsibility for implementation. These personnel provided the historical background to the developments in secondary school technology courses. They assisted in the formulation of the policy change and discussed the internal issues that drove the initiative. They could comment on the attention paid to the curriculum for low attaining students. The Ontario research is limited to English-language schools, because the language of the researcher is English. In addition, the

curriculum base of the French-language secondary schools is different.

An interview with one civil servant in each location who had participated in their initiative from the beginning, enabled the researcher to obtain their view on the political sequence of events as experienced within their government department. In each system, the government of the day delegated implementation to a government department. These departments are recognised as carrying forward the governments' interests and the official policy is the view they contribute. The fact that the researcher formerly represented the same interests made the discussions more collegial than naïve.

In Scotland, the original designation was for the MSC to implement the policy, but that department, in turn, delegated major responsibility to the educators in the Authorities and the SED was part of the advisory unit. The MET in Ontario had similar implementation responsibility. Hence, a government department in each location had some responsibility for the initiative and recognised the changes to the technical curriculum. The school-level personnel developed the content within the constraints set by either the SED or the MET.

The second government SED staff interviewed in Scotland described the department's position from the perspective of the scope and sequence of the technical curriculum. The SED established its curriculum from experience gained from the pilots of the technology curriculum and the TVEI and information gained from the network. In addition, discussions took place on matters of organisational relationships with the Authorities. The TVEI raised issues where deliberations were necessary to resolve matters of autonomy and control, professional education issues and local political ones. Funding is as an ongoing concern to maintain the direction of the curriculum changes. The level of funding remains the government's responsibility ultimately.

In Ontario, the civil servants chosen for interviews were those who had similar implementation roles. The discussions concerned the implementation plans with their attending problem areas. Some parts of the province are remote and have few personnel and resources. This made it difficult for the policy implementers to provide equity. The planned additional support was not forthcoming during the implementation; hence, the Board personnel were on their own. They were aware that they are

competing for student registration, unlike the situation in Scotland, where the central decision to extend technical education into every student's timetable eliminated the necessity for teachers to compete for students.

3.7.3 Questionnaire Development

Administrative personnel interviewed in each location contributed to the then proposed research, its areas of interest and its format. The functions of the technical teachers provide a view of their role in relation to the initiatives. The questionnaires and eight related interviews followed implementation at the school level through teachers' functions that influenced changes related to the students. The questions themselves pertain to the issues identified in the literature review and in the first set of interviews. The questionnaire design is mixed and therefore the responses have two different formats. This necessitated a categorisation to be generated for the presentation of the open-ended questions. Presentation of the remaining data collected is as percentages.

Limited pre-testing of the questionnaire occurred because of the availability of the personnel who assisted in refining the questions; also, some time constraints related to the research. Therefore, the pre-test by four personnel may not include a large enough sample from each location.

Since the TVEI co-ordinators in Scotland or technology directors in Ontario are the personnel in schools charged with policy implementation, the mailed questionnaire requests them to evaluate the initiative. Because the policy has broad purposes, development of all aspects of each location's aims may have been incomplete at the time of the mailing. Schools usually take about 20 years to institutionalise a major change according to one government staff (MET, 1992). This normally includes the number of years that the cohort is in the schools. Since the curriculum developed was for all students, the understanding is that there is a broad professional input. In fact, the time constraints of the classroom limit the teaching options. Because the questionnaire development occurred after the literature review, and as part of the exploratory interviews with some of the senior personnel and researchers, its design intends to assess the way control occurs in the schools. Though it covers policy implementation, it does not identify

the larger constraints that the documentation and interviews revealed. The student outcomes, in terms of the low attaining, non-attaining or failing student and exercise of control rests in part with other committees and practices established outside the schools. The questions for all schoolteachers in each location are similar, but there are adjustments made for the local terms and equivalent structures.

The questionnaire was tested by two Authority and two Board personnel attached to the initiatives. These personnel were timed to obtain an estimate of the time needed to complete the questionnaire. From their suggestions, some of the wording of the questionnaire was revised to increase its clarity. The topics covered in the questionnaire represent the areas in which the responding co-ordinators or directors had responsibility.

One addition suggested by the initial respondents was the students' performance in mathematics and language. The educators indicated that a view of the students' performance in a wider range of subjects gives a more reliable view of students' overall functioning ability. Adjustments to the phrasing of the questions corrected this, and wording was modified through the use of local terminology.

The questionnaire was in booklet form, the desirable format (Paterson, EU research seminar, 1992). The length of time to complete the form was to be less than 30 minutes. To encourage respondents to reply, a summary was on offer by request. A follow-up letter encouraged non-respondents to reply.

The collection of quantifiable data for this policy research was through a simple random sample of secondary schools by means of the mailed questionnaires. Mailing was in March 1993 requesting information on the then current in-school practices and outcomes. Determination of the sample size with the table presented by Isaac et al. (1981) provides the confidence level for generalising from the results and offsets any sampling error. This meant that the mailing for Scotland comprised 186 questionnaires. The Ontario mailing consisted of 242 questionnaires sent only to English-language schools.

3.7.4 Post-Questionnaire Interviews

Enhancement of this thesis includes eight additional interviews in both

Scotland and Ontario in the fall of 1993. These interviews clarified issues at the school level emerging from the questionnaire.

The interviewees were those made available by the Authorities. It is unclear if there is a pattern of who was available. The expectation was that interviews would require about one hour during school hours. While these interviews were open-ended, the introduction given to the interviewees indicated that the research focus was on the low attaining students. The interviewees discussed their functions. As most teachers in Scotland at that time did not have a conceptual framework that addressed the educational needs of the low attaining students as a distinct group, the discussion explored their ways of managing multi-ability classes. As these interviews took place in secondary schools, it allowed for classroom visits in those schools where teachers made the offer and their timetable allowed for it.

3.7.5 Site Visits

Site visits were not an original proposal of this research, but they provided the additional component of observing the students' response to the new curriculum. While the site visits allowed for direct observation of some of the interviewees' classrooms, the visits also act as a verification of the teachers' comments on their functions related to the questionnaire. The caution here is with the general impression created. The analyses of the interview statements consist of those directed to the low attaining students. The interviewees' input is included with the results of the in-school responses to the questionnaire. Their experience is at the school level and provides additional qualitative data.

3.8. Data Analysis Issues

3.8.1 Documents

The governments' policy documents for this policy analysis were evaluated in relation to the relevance of the provisions within the context of provision for 'across the ability range' while attending to the issues of political and professional control and flexibility. These materials consisted of the government documents, the Authorities' or Boards' materials and teachers' materials. The participants provided documents related to their input into the initiatives at their level as well. Of note were the document statements pertaining to the range of ability. Also noted were the interpretative statements in related documents. As the policy statements are very general with little

direction regarding how to provide for ability, it was necessary to interview those who interpret the documents.

While the use of multiple sources of information for this research increases the validity and the reliability of the findings or conclusions, there remains the question of what happens according to the documentation compared to the experience of participants. According to Yin (1994), different conclusions may result from each method. Both have validity, but they represent different positions. The documents contain the official public positions but that may be different from the interviewees' reports as to what is actually occurring in schools.

Aside from reviewing the official policy documents concerning the initiative that were available from the governments, I also examined other documents provided by the informants. The materials varied with the function of the personnel in relation to the initiative. A sample application used for each project approved for funding in Scotland and Ontario was available to the participants. Matching of government documents and materials from schools indicated the extent that there were parallels in both educational systems. In the Ontario case, some documents were missing because of the change of government and turnover of personnel. These included documents such as the list of applications approved. There was more official available for the Scottish Authorities and schools than for Ontario.

The only known restriction on materials has to do with funding refusals, which are confidential. There also were some materials used as background professional materials that relate to specific programmes or personnel and available according to the ethics for sensitive areas. The level of the lesson plan and the range of students' responses to the learning activity could be ascertained from examples of students' work viewed in some site visits. These documents may inadvertently create a reporting bias on my part since they may reflect the bias of an educator in relation to students and the material, which someone from outside education would not have.

Also examined were the position papers of the political personnel in both governments and material from their meetings. In some instances these documents, which were produced for a specific purpose, illustrate evolving plans and curriculum materials. The most significant are those

materials that finally received official recognition after long discussions.

The weakness of the documentation is that some of it had been prepared for official use, and only for internal use that serves the purpose of addressing the specific needs of the education system. Some of the documents are difficult to understand, as they are prepared with educators in mind. The minutes of the meetings attended, for example, did not reveal the extent of the discussions or the academic compromises made in dealing with the organisational issues. The minutes would read 'X approved' at the end of the meeting. These minutes are internal to the group and are not available to the rest of the educational system.

Another difficulty encountered is with the use of computer aided search for material. The focus of this thesis is secondary school technical and vocational education. The four searches, two in Scotland (1992, 1996) and two in Ontario (1992, 1996) of educational databases, did not identify a body of related literature covering the political perspectives.

3.8.2 Preliminary Interviews

Two Ontario provincial-level personnel who led the government initiative are part of the internal committee who determined the form of the initiative. Their interests were with issues of curriculum development representing the more advanced technical courses and the resourcing of classrooms to provide the curriculum. Resources would include the approach to teacher in-service training at the Board level. One stated clearly that funding of equipment to schools was the priority. According to this interviewee, there was no special focus on ability groups in the documents, nor was there interest in these students at the committee level. The second committee member verified this. Whether this reflected the official government interests (see Appendix C) rather than the committee's opinions is questionable. While they were subject specialists and often provided interpretation of government policy, the acceptability of their position by other officials throughout the system is unknown.

Subsequently, two of Her Majesty's Inspectors (HMI) interviewed in Edinburgh represented different interests. One HMI who had participated in the initiative from the beginning described the political sequence of

events in the wider context of the UK. While the interviews focused on the topic of the low attaining students, only this one interviewee had previous experience from which to discuss these students. The second HMI gave the Department's position from the educator's perspective of the scope and sequence of the curriculum. In addition, this interviewee discussed the organisational relationships with the Authorities.

The next personnel interviewed were two Supervisory Officers in Ontario who had implementation roles in the technology initiative. They provided the implementation plans, historical developments and scope. The remote areas are their concern. Their planning involved additional support from the Ministry. When this was not available to the Boards, questions arose over Ministry credibility.

The Authority- and Board-level personnel interviewed next discussed their functions. The analyses of their interviews contain the same perspective as the government personnel. Identification of the similarities and differences in official interpretation of the initiatives originate through this comparison. Generally in Scotland, owing to the integration of teachers' input in committees and the use of consensus, a high level of agreement is anticipated, whereas in Ontario, personnel bring their own understanding to the policy.

3.8.3 Questionnaire

Limitations to the questionnaire are due to the previously mentioned pre-testing. When the administrative personnel indicated that a view of the student performance in a wider range of subjects gives a more reliable view of student ability, the analysis includes those subjects. More than one indicator influenced the evaluation by these personnel of students, whereas classroom teachers have only their subject on which to base their evaluation. The implication is that different interpretations of questions are possible. While it appears that respondents understood the questions as written, the comparison of results indicates a range of interpretations. Furthermore, the estimate of time needed to complete the questionnaire may have been inaccurate. Two classroom teachers indicated that it took them longer than 30 minutes; an additional teacher said it was too time-consuming to provide the data; and another stated that in the Scottish school year March was too busy for compiling the attainment section of the questionnaire.

The responses that incorporate the issue of relevance for low-ability groups may reflect the organisational structures in each educational system based on ability. Restrictions of the respondents' statements on their function related to the low-ability group may occur because of the questions themselves. While the open-ended questions meant to solicit their views, the respondents may have provided only the official examination policy.

The number of surveys returned was 112, or 26 per cent: 52 from Scotland and 60 from Ontario. Though this response rate is acceptable, it means that confidence in the conclusions from these data, although supported with the triangulated data, is low. The majority of the respondents in each location come from the largest city where most of the population lives. There did not appear to be a significant difference in the responses between the largest city and the remainder of the locations.

The response rates are in line with the expected rate of 25 per cent to 30 per cent that J. H. Frey (1989) considers acceptable. S. Sudman and S. Presser (1985) say that very often elite or professional respondents are not willing to complete a questionnaire for several reasons: they are too busy or consider they have a better use for their time. The questionnaire's value may be unclear to them, or they may considerate it unimportant, or they may be concerned about the confidentiality of the results even with the assurances from the researcher. The questionnaire itself may appear to them to be biased, or not to offer enough ranges of suitable choices even with the open-ended questions. In this research, the question of research bias in terms of interest in the low attaining and non-attaining student may be a factor. That is, the professionals may not wish to have information known about those students in their schools and classes that may reflect on them or their instruction. According to Frey (1989), response rates in general are on the decline for all methods of research.

The Ontario results represent an over-sampling since 100 schools were noted by a lead senior staff (MET, 1994) not to have implemented the policy. Some of schools that were eligible to apply for funding were found not to have implemented the technical and vocational initiative at the time of the questionnaire (MET, 1993). How many of the 100 refusals are French or how many are English is not known; therefore, adjustment cannot be made in the response rate. Generally, the French do not reply

to requests in English. This non-response to the initiative as a whole is taken as a rejection of the initiative by the MET, a refusal for various reasons. With extension of the initiative in Ontario, the Boards and schools have to make a decision whether technology would even be on offer. During the later years of this research, those schools with technology courses were forced to take part in the curriculum changes. The reasons for a Board declining may be financial problems with its local tax share, or lack of trained teachers. After extension, the MET informed some Boards that they could no longer offer trade-based courses unless they met the following conditions; they would have to provide the equipment themselves without the MET and the provincial share of funding and with their own teachers trained in the new approach.

It is not known how many schools in Scotland have not implemented the extension of the TVEI or the technology curriculum, because the funding basis changed and became part of the flat rate of the Authorities. Nor is it known how many schools in Scotland did not implement the policy because of job action. In part, this is a question of the relationships between various levels of the system, the Authorities' resources and funding. Along with job action, these factors are influences on the response rate.

In Ontario, several issues coincided with the technology initiative: the social contracts, the academic nature of the changes, other policy changes, the retraining required of some teachers and lack of interest. Only two Ontario schools sent back their questionnaires and indicated no implementation as a reason. In Scotland, one school indicated they did not offer any technical courses, and one indicated that the school had only begun the technical courses in the current year.

Frey (ibid.) does suggest that it is impossible to separate a deliberate failure to complete questionnaires from those undelivered or lost in the mail. For Ontario, the postal service returned three surveys; for Scotland, two were returned undelivered. In both countries school closures are a reality with declining enrolments due to population shifts and ageing schools. That may account for the returns and some non-responses.

Frey (ibid.) goes on to suggest that those who return questionnaires may have characteristics much different from the population they represent.

The written-in comments reveal a genuine interest on the part of the respondents in the provisions for the students with non-attainment or low attainment. However, in both systems most respondents did not wish to provide the statistical data on attainments. As this is school information, there may be restrictions due to school policy, lack of time or administrative reasons regarding the release of that information, although the interviewees did not say so. It might have been useful to indicate a timeline of the last term's available figures on the questionnaire. However, as teachers and classes are changing constantly between terms, the figures from the last class or the last school would confuse the data.

Owing to the wide variation between schools in their implementation, some teachers may have felt that the questionnaire either would, or would not benefit their schools, or its practices related to the low attaining, or non-attaining students. The non-response may be a reflection of the low status of these students, some general lack of interest in them or belief that nothing changes.

In both countries, the range of the in-school results in regard to attainments is insufficient to identify in-school differences for statistical analysis. In general, the academic position for reporting results of research is that even the less successful research should be reported in order to add to the wider body of knowledge, both at the level of questionnaire content and at the level of design (Paterson, 1992 EU research seminar). The position taken by this researcher is that the respondents wanted to reply to most of the questions. The response rate is acceptable for those portions of the questionnaire. The data reported include an indication of those areas that are acceptable and those that are not. The interesting fact that in both countries teachers choose not to report attainments should be reported as well. This raises questions not only about the basis of attainments generally, but about why teachers' respond this way. As their examinations tend to be subjective (Johnston, 1991; Dunning, 1977), teachers may be reluctant to have this area of practice open for review. Also reported are the opinions of those respondents who took the time to report their in-school circumstances. From a wide policy perspective, the refusing respondents may represent one side of the education debate. Some administrators of this view participated in the pre-test of the questionnaire, so they represent these views. The research intention is

to adhere to the inclusive and employability intents of the policy for these students.

In Scotland, the TVEI has been a highly evaluated initiative. Some respondents say it is an over-evaluation of one subject area. The Scottish teachers did not wish to have their schools' attainment measured, as the publishing of league tables places them in the public eye and implied that failure rates reflect on the teaching and personnel. Education became part of the political debate with this initiative as part of the 'Great Debate', a new experience for personnel and that no doubt has influenced the responses.

The Ontario teachers had similar concerns about making student success rates public knowledge for similar reasons. In general, teachers have not been accustomed to education being part of the political debate. Teachers do not expect evaluation of their teaching to be in the public domain as traditionally supervision and inspection is within the profession.

Although the questions were pre-tested, there is no guarantee that the respondents understood them as intended owing to the differences in terminology between Scotland and Ontario. The changes made after the pre-test corrected for this, but differences may still remain. The use of one form for both locations was intended to provide for reliability between locations. One respondent said that the intention of the questionnaire was difficult to understand given the differences of the two systems. There is also no guarantee regarding who actually filled out the questionnaire. During one interview, the indication was that an assistant filled in the questionnaire designated for the co-ordinator.

The simple random sample of respondents, the TVEI co-ordinators or department heads, is the number determined from the table provided in Isaac (1981, from Krejcie and Morgan, 1970) to minimise sampling error. As indicated earlier, the population distribution in both educational systems favours the larger urban centre. These centres have more academic support personnel available to schools than the small centres. Their consultants provide the direction of the initiative beyond the single school and use the networks of school-based teachers to arrive at a broad consensus of schoolteachers directing the initiatives.

The analysis of the questionnaire, excluding student attainment data, covers the following:

1. For closed questions: tabulation of yes-no responses to define percentages provides for a frequency distribution of responses.
2. For open-ended questions, the developed categorisation provides for reporting the results.

Due to the response rates on attainments, correlation and analysis of variance demonstrating interrelationships is unavailable, but other secondary sources of data are included in the case studies.

3.8.4 Post-Questionnaire Interviews

The post-questionnaire interviews conducted with technical personnel were in secondary schools. A combination of their input with the discussion of questionnaire results allows for their experience to be included while ensuring confidentiality at the school level. Their comments were examined separately to see if there was a different conceptual base. The post-questionnaire interviews were open-ended with some qualifications. Some discussions were for clarification purposes, such as the setting of classes and differentiation. Interviewees raised their own issues and analysis within the context that related to the low attaining student. Those issues that are system issues, such as, the rate and number of changes in the system and the political perspective of the interviewees inform the context of the research.

All interviews were planned to be about one hour in length. The following exceptions occurred. All interviews attempted to cover the four functions generated spontaneously by the interviewee, or in a general discussion of 'How do you provide for low attaining students?' The reporting of the interviews are grouped to protect the confidentiality of those participating. These interviews took place in 1993. The interviews and the questionnaires examine the senior personnel's control of schoolteachers. A wide range of personnel is responsible for technical education. Head teachers of other subjects are the technical co-ordinators in some schools. Delegation of responsibility for the implementation was not necessarily to technical subject specialists.

The teachers of two schools explained their views on low attaining students and how they accommodate those students. Although the purpose of the interview was explained to the Authorities in writing, in one interview there had been an oversight in conveying the intent of the interview to the teacher. All the Scottish personnel reported that they

did not differentiate students. Therefore, the discussion was of the approaches to undifferentiated classes and individual students. Owing to the number of students, classes often had three groups. Hence, the school-level classes in Scotland had ability groupings similar to those in Ontario, and the two models of education were indistinguishable for part of the analysis.

Most school-based interviewees described the local school issues. This included indications as to the nature of employment in the area and the possibility of movement to areas of higher employment given the wider employment issues. In relation to the schools' students, basic skill needs were raised, such as ability to work with others, basic literacy and numeracy.

The Ontario personnel expressed a range of opinions regarding low attaining students. Students are either in segregated classes or mixed-ability classes. The discussions of these students is in relation to technical education and their learning needs in relation to the defined curriculum and classroom organisation.

It is of note that one Scottish interview took less than an hour because the police came to the interviewee to request interviews with certain students. A second interview was interrupted by the verbal abuse of a student by a teacher outside the office.

In addition, the format of the interviews varied from the initial four exploratory interviews, which were totally open-ended. The remaining interviews attempted to focus the discussion of the initiatives more on the four functions of teachers in schools. With two of the personnel, the interview lasted more than an hour as the interviewees had issues that they wished to discuss, such as, funding. Of course, those interviews that included class visits were longer.

3.8.5 Site Visits

The direct observations in some schools provided a reality check on the implementation of the curriculum in both education systems. The learning environment and interpersonal relationships of the classroom occur at times in less than the ideal circumstances. These visits were not part of the original design of the research, but through taking advantage of a happy circumstance, the result of the voluntary invitation from

teachers into their classrooms. The possibility of the 'halo' effect in this situation exists since the researcher was favourably impressed with the generosity.

One methodological concern surrounding the interviews and visits is the possibility that all of those interviewed wanted to portray their role, their system or their school in a positive manner. These visits were open-ended and gave the teachers further opportunity to demonstrate their curriculum. The four main functions were in evidence in these visits. Furthermore, the interviews with senior administrators concerned classroom practice and their current experience with low attaining students and the implementation. Many of the teachers had concerns with the ongoing funding problems for maintaining their classrooms.

In Ontario, the current debate regarding possible provincial examination of students was a concern. Teachers' comments not focused directly on the research as explained are treated as contextual. The basis of the analysis on comments outside the four role functions is on identifying whether the comment is political, professional or personal and its relevance to the topic. The four functions that the professionals control at the school level are the areas that the political agenda was attempting to influence.

The creation of a positive impression occurred also when teachers voluntarily gave me their curriculum material. These gestures from those interviewed may result in a positive, less critical impression of the interviews and classes observed. In addition, the teachers presented an apparent successful approach. Most noted their contribution to the effort of the initiatives as a whole and, more specifically, to that part of the curriculum where they had input. There may be a halo effect here as well. As noted, with these initiatives education was placed into the political arena. As these are funded initiatives, there could be seen a need to satisfy the funding source. Consequently, the research may place a positive interpretation on the results since the conceptualisation of the research is within the understandings of the education system as it relates to the wider context of the employability issues. Moreover, the literature surrounding the initiatives supports the perceptions of the dominant group. This may occur inadvertently, as there are four perspectives: the politician, the educator, the government policy analyst and the researcher. There is also the

possibility that all parties miss the wider implications of events between, in this case, education and employment, education and manpower, and education and the political and professional interests. The interviewee's views represent their sector's interests.

In conclusion, the methodology for this comparative case study approach to the technology initiatives synthesises existing policy evaluation. The analytic framework provides both qualitative and quantitative approaches, which allows for the triangulation of methods. These methods include document examination, personnel interviews, classroom visits, a policy and implementation analysis, and a mailed questionnaire. The discussion concerns the limitations of these approaches related to access and confidentiality issues that shape the results. Those sections of the quantitative research asking for attainment rates did not have acceptable response rates. Analyses presented are for those sections that have acceptable response rates along with the post-questionnaire interviews and secondary material with a caution regarding generalisations. The qualitative experiences of personnel working with low attaining students provide the practice aspect to attainment of the policies' aims.

Note

To assist the comparison of how schools accommodate the students of interest, the German alternative identified in the literature serves as a benchmark and led to eight interviews in Germany in 1993 with administrators and classroom teachers.

CHAPTER FOUR: SCOTLAND: A CASE STUDY APPROACH TO POLICY AND IMPLEMENTATION EVALUATION

4.1 Introduction

In the UK in the early eighties, the argument in education divided into an either-or one between liberal or grammar school education and technical education. The manpower policy, which originated with MSC, extended into education. It applied to the whole of the UK and thus the criticism is in part, that the TVEI is a London solution for all the countries involved. For that reason the TVEI threatened liberal education with industry's view of the purpose of schooling (Dale, R., 1985). The opposition continued in the same either-or fashion; the possibility of including both liberal and vocational education in comprehensive schools was ignored. The both-and solution is inherent in the 'mixed model' as both education and training are components and in

spite of the opposing views evolved as the solution as the following demonstrates.

To examine the TVEI events, the organisation of this chapter follows Downey's phases (1988). The policy description used in this case study establishes the basis for the comparison in Chapter 6 with technical education structures in Ontario. After an introductory background, this examination of the TVEI includes first, a descriptive analysis of the policy developments; secondly, the new technology policy; and thirdly, a review of the policy and its implications.

4.2 Manpower's Intervention

In 1982 the Conservative government announced its intentions to respond to rising youth unemployment with the Technical and Vocational Education Initiative. The Manpower Services Commission had implementation responsibility and the writ (Appendix B) stated the intention of involving secondary school programmes for the first time. The MSC chairman, D. Young, promised that school leavers 'will be highly employable' (McCulloch, 1991) The writ frankly stated that the proposed projects for funding should improve the skill levels of young people, thereby preparing them for work. The target population included the more able studying the academic curriculum.

Reaction to the initiative in Scotland was swift and unfavourable, but the attached funding was attractive. Scotland had plans for the same student population: for the 16-18 age group in the *Action Plan* and for 14-16 year olds in the *Standard Grade* proposals to widen certification and increase staying on (SED with SQA, undated). To access the funds compromise and negotiation with the central TVEI unit was necessary; hence, the pilot projects did not start until 1984. There were five funded projects had a variety of approaches, which overall were well received, but the reaction by the critics on the left was concerned with the intentions of the Government towards a section of the population.

4.3 Education in the 1980s

Owing to the problem of identifying the situation of the low attaining students within the current educational system, the extent or nature of the issue of their certification is not readily available. Non-attaining students in 1981-82 comprised approximately 30 per cent of the student population and an additional 10 per cent, approximately, received the

'O' grades of level 4-5 (SOSB, 1991).

Though the name changed from 'O' to 'S' (Standard) grade during the eighties, Scotland's method of differentiating students generally remained the same within the curriculum, as did the evaluation of students' learning. The curriculum had begun to change as a result of the consideration of Munn's and Dunning's reports (1977), but examinations are the mandate of the Scottish Qualifications Authority (SQA), which maintained the former differentiation while providing for its certification. The certification was intended to include low attaining students to reflect changes to the curriculum. These changes occurred outside of the TVEI but the TVEI incorporated these directions. Because of job action it is not known how many schools accepted the changes in the late eighties. Some of the TVEI innovations influenced the methods of Standard Grade.

One of the myths of Scottish education is that students are not differentiated before the national examinations (Flude, 1990; interviews, 1992,93). In fact, however, there are indications that in comprehensive mixed-ability classrooms, defining of ability takes place for instructional purposes. That is, a subject usually has low, medium and high student groupings. This occurs even in classes that are informally 'set' to have only higher students (Authority interviews, 1992). The results of examinations of students 'when ready', the formal practice is to categorise students by attainment. The lower Scottish Certificate of Examination level reported in 1991 as former 'O' grade is now 'S' grades 4, 5, 6, and 7. These levels indicate that the student is a foundation student, i.e., most often less able (see Chapter 2). This categorisation is aside from the system of special-needs identification. In Scotland, placement of special-needs students takes place at every level - foundation, general or credit.

Before Standard Grade acceptance, the curriculum was given uniformly to all students and generated different levels of attainments. Placement of low attaining students was in mixed-ability classes with other students of a similar age. Comparison was with the total range of ability in classes organised by age groups until 'highers' examinations formally select academic-bound students. Although modifications of student work assignments are with the advice of classroom teachers, the low attaining students are essentially failing to achieve in the curriculum provided

to the total group (SED interview, 1991). The curriculum served to determine ability groups, as the advice given was not intended to provide for equality. These curriculum adjustments, together with the setting of classes, are informal practices which offset the formal classroom organisation; yet, formal examination recognises this accommodation for ability in class by the level at which the student takes the examination. Note that the students assume a definition by the classroom grouping process and the purpose is to convey students' characteristics for learning purposes. In practice, this meant that a portion of the Scottish student population could never aspire to any certification of secondary schooling. The Standard Grade and TVEI courses changed these practices. Now the focus of differentiation is on courses to address students' learning needs providing an institutional versatility to both teachers and students claims Croxford et al. (1991).

Some students leave school without certification, either voluntarily or not, to look for work (Raffe, 1984, 1988). Some must leave for economic reasons to receive the training and the allowance provided by the Youth Training Scheme. Other students who are not successful later seek social benefits. The structure of available choices is such that there are limited options for the low attaining and non-attaining students.

The issue of accommodating attainment and ability differences raises the question of relevance. Why provide a curriculum that many students cannot master in a manner in which these students are unlikely to benefit? With the new interest in education, training and provision of wider access to certification, this question is important for this study.

Education is primarily a universal policy for students within the age of mandatory education. The form of universality was to provide all students with the same undifferentiated curriculum regardless of ability to attain the curriculum (SED, 1991; TVEI administrators and TVEI personnel 1992, 1993). This former approach to universality does not allow all students to seek certification. In Scotland, the belief exists that based on ability and one form of merit, examination, education provides for some redistribution of resources in its universal provision until mandatory school-leaving age (Raffe, 1984, 1988; Flude, 1990). This is questionable. Because education is both regulatory and constituent, it determines the way in which specific students can

participate based on the system of attainments (Lowi, 1972, cited by Downey, 1988). Selection for participation exists before and after the age of school leaving due to the attainment policy after examination, all of which excludes students from different paths in secondary school. Before examination, the exposure to the same curriculum ensures equal treatment but not opportunity at the end of the process.

4.4 Students of Interest in Scotland

In the 1980s, the students we are studying in relation to technical education went unrecognised before examinations. The formal definition of the foundation students proposed by Dunning (1977) began to be used in 1986 for selection of the curriculum and for certification beginning in 1989. Success for students means attainment interpreted as a better level on examination.

Students may take examinations at two levels, foundation and general, or general and credit. The Local Authority has to pay for these examinations, in some schools there is system pressure not to present for examination those students expected to be less successful (Authority staff interview, 1992). With the introduction in 1992 of published school results, such practices are more open to public scrutiny, as well as the numbers of students who are early school leavers (SED annual statistics, 1983 to 1991).

Students were unlikely to stay on when told essentially that the schooling had no programme that could meet their learning needs. The former non-advanced courses did not lead to certification. The old structure of determining attainments served to deprive some students who are entitled to a secondary school education, and raises equity issues. The form of educational provision becomes a matter of programme relevance for these students. This thesis asks: Could appropriate schooling based in learning needs with meaningful certification not be made available to low attaining students at their level of attainment?

4.5 How Many Students Are There?

In Scotland, Her Majesty's Inspectorate stated that the term 'learning difficulty' could be applied to a wider and more diverse range of pupils (SED, 1980). One in five students could have special needs, and one in six need assistance through their entire education. Atherton (1989) says that more than half the student population has special education needs. Although special-needs identification may include some of the students

of interest in this research, not all students will have their learning needs recognised by the system. At present recognition of less than 2 per cent of students occurs in this manner (SED, op cit.). Given that in 1982, 30 per cent (SOSB, 1991) of students are not attaining certification, and a further 10 per cent (ibid.) are at the lowest level, a large gap exists in the system supports for the low attaining students. The TVEI had the potential to address that gap.

4.6 TVEI: Development Stages of the Technology Policy

4.6.1 Initiation

Certain themes in the debate around the introduction of the TVEI require exploration. There is an assumption in Scotland that equal access to the curriculum examined nationally provides for equality, even though, as a result, students are further differentiated and graded by ability (Raffe, 1984, 1988). This is equal opportunity in the Scottish perspective. A competing student-centred educational approach, does not accept the strict grade-level and age-based approach to the national assessment because the latter does not account for developmental differences or provide for equal benefits. In the student-centred approach, the purposes of secondary schooling are defined widely. The SED did not wholly accept this opposing view which was based on cognitive development and voiced by the teaching professional (Raffe, ibid.). Even with its idea of a wider role for the school, these learning approaches and the SED do not approach education based on capability or for citizenship. Until the 1980s, this deficiency was most evident in the lack of equity provisions for the non-academic student, who was under pressure to leave school at about age 16. Wider debates around equity were not prominent in the education debates or literature in Scotland. While Munn (1977) acknowledged this deficiency, her report focused on the curriculum for the total the student population.

Other perspectives than those seeking equal opportunity and equal treatment, such as those supporting normalisation and inclusion of all ability groups, would seek equity for all students. The then current student designations based on attainments are in relation to the academic curriculum and not based on criteria that are more concrete if to be academic means more theoretical, abstract and not conveyed through practical means. Up to the present, the student with the highest attainment receives the most educational accommodation, not only through curriculum appropriateness, but also in the number of years of schooling.

Whereas in the past, some students benefited by more years of schooling and expenditures, vouchers are an idea used to balance the amount of spending among all students. In this approach, student recipients of policy receive the maximum freedom to make education choices and remain within the policy's scope. Redress of equity provisions to students who withdraw from school, because of the system's failure to provide schooling appropriate for their learning needs and 'choice' is within the mandate of the MSC's programmes.

The Manpower Services Commission (MSC) defined secondary school education in terms of the attainment of generic and specific skills useful for employment (MSC writ, 1982; Appendix B). This definition is so general, given the nature of education that it appears to cover everything that is known and applied to all subjects, as the focus of employability. It became the task of education committees to implement the TVEI within the framework of the secondary school curriculum. The choice made in the approach of education to the TVEI was to remain within the constraints of the curriculum framework and accommodate the criteria that the MSC set out (ibid.). The criteria of that aim are as follows as adapted from MSC by the SED:

- aims that could be achieved quickly and cost effectively
- easily replicated
- consistent with Vocational education for under 16 year olds and outside the school environment
- be evaluated
- managed locally
- subject to monitoring by both MSC and the TVEI unit. (SED, 1989))

For the purposes of this research, the discussion will concentrate on secondary school developments of TVEI. Flowing from the aims of the TVEI, the theme of relevance in terms of 'organising and managing' (MSC Writ, 1982) schooling is predominant. This theme is articulated in terms determined by the MSC and was to represent the interests of the central government (Shirley, 1991). Contained within this overall direction are issues of control, both political and professional, of TVEI in secondary schools. Yet there is a political recognition of the need for flexibility as well, since the aim is to 'explore and test ways' (MSC Writ, 1982) of providing schooling for these students. The aims of the TVEI implied that there were better ways to provide education to this age group, as Munn (1977) and the SED (1983) indicated. Since the

curriculum and student attainments are the targets that the TVEI influenced, the events it initiated are relevant here. One target that the TVEI lacks is references to the actual employment of students.

Attainment means both staying on and certification (op. cit.). The changes for the system meant that all students would have the opportunity to receive certification for the level of education they attained. Educators originally questioned the relevance of TVEI for Scottish education saying the direction of the system had turned to the adoption of the Munn Report (SED, 1989) to restructure the entire curriculum for secondary school. Further, the certification scheme integrated that curriculum with the assessment recommendations of the Dunning (1977) report.

During this time, a reluctant recognition of the need for change in the technology curriculum by the SED (SED, 1989) had been developing. In fact, the HMI indicated that there were internal reports on technical education dating from the late 1960s that remained unimplemented. In addition, preliminary planning budget allocations for implementing the Munn Report had been received. This funding was not as generous as the TVEI's. Then with the addition of the TVEI funding, plans for the incorporation of the implementation of the Munn and Dunning Reports were along with the TVEI projects. The ease of assimilation claims Bell et al (1989) is due to the adaptability of the system and climate of Scottish education.

The Conservatives' central plan for Scottish education was resisted by the Scottish nationalists (SED interview, 1991). Some of this resistance came from a defence of the current comprehensive system and from a dislike of any solution for Scotland by the central English government (SED interview, 1991). The educational officials in the Scottish Office and the SED made decisions under pressure to respond to the central government announcement of TVEI. This group of professionals had an uneasy relationship with the education administration of the Scottish Education Authorities and the rest of the education personnel, partly because of the supervisory role of the HMI. The working relationship and timetable did not allow for a full study of the possible solutions, given the directive of the TVEI (ibid.). McIntyre (1985) and Conlon (1989) indicated that the SED controls the decisions by controlling information in part through occupying important positions through a

system of patronage amongst a small group of senior educators.

A second reason for resistance to the TVEI was that the lead had been given to the MSC, who related directly to the Local Authorities, hence side-stepping the professional educators of the SED. Therefore, the working relationships were such that they prevented full exploration of the education and workplace possibilities inherent in the TVEI.

4.6.2 Creation

The TVEI announcement was not made in the usual official position paper, but in a letter from the SED to the Authorities in the spring of 1983. The letter invited them to submit a project proposal after the political announcement by the central government. The applications were part of a competitive process, and the approval had to include the MSC's input to ensure the above criteria. Since the funds flowed through the MSC, the MSC in a manner sidestepped the SED again. In fact, the SED stated (1991) that the Authorities were given a free hand in the application process, whereas the SED's presence with the Scottish Office at the committee level provided the image of Scottish national autonomy in education. Because of political debates on nationality during the period of implementation, the government needed co-operation to avoid raising the nationalist issue. Hence, the Munn recommendations came to be accepted as the reason for the delayed implementation in Scotland.

4.6.3 Analysis

Analysis of the TVEI occurred in two main areas. First, the central Scottish committee analysed the applications as to their attention to the central aim and balance of the curriculum development. Since discussion of the suitability of the applications was an internal matter, consequently, it was not available for this research. An advisory group of administrators was set up for Scotland, including the advisor from Scotland appointed to the UK's central government TVEI Unit. This unit was the central decision-making body for TVEI. The UK TVEI Unit also acted as a central resource by maintaining the documentation of all UK projects and the resulting literature.

During this phase, before the fall of 1983, the strategy was to incorporate modules (SED, 1985) along with the TVEI curriculum development across subjects. In addition, student evaluation criteria based on Dunning's report became part of each module.

The second result of the committee analysis was the acceptance of modules that used SCOTVEC descriptors and provided for external SCOTVEC recognition by using course development learning materials or enhancements. Note that some non-advanced courses in some schools used modules before this time based on SCOTVEC's descriptors (SED and TVEI interviews, 1992) making it difficult to isolate and identify the effects of the TVEI.

4.6.4 Choice

The central Scottish advisory group agreed to establish a network of Authority TVEI personnel and, throughout the network, to use a common module format for the learning materials of the TVEI. Most of the projects chosen consisted of agreements to develop modules. The development of modules was the basis of the substantive policy change introduced by the projects in the fall of 1983. The sanctioning of their development by these personnel became the method of controlling the curriculum and this highly political initiative.

Five pilot projects were chosen to develop modules with the TVEI funding for £2 million each. The projects consisted mainly of teachers developing and testing modules in the Authorities' schools using contracts to specify the curriculum area they were developing. The projects consisted of four years of technical education to be provided through the modules to all ability groups, providing skills, work experience and equal opportunity. The latter in the Authorities meant gender equality in provision and does not refer to minorities or ability. This funding extended over five years, and applications were yearly for the projects.

Attention to the thinking skills, concrete or abstract, of the various levels of students do not appear in the modules, nor how to move from one level to another, other than suggesting the use of problem solving, a metacognitive skill. Teachers had a range of modules from which to select for their classroom. Because they used classroom projects that they evaluated, the change in methods to student problem solving and decision making, especially in groups, claims to be an advantage in the TVEI courses. This methodology extended to the total curriculum later with extension of the TVEI to all schools.

The modules demonstrate the treatment of the ability range issue. The

evaluations of the modules describe response categories grounded in developmental stages for each student level. Thus, Munn's (1977) curriculum approach represented in the modules also represents the system of student assessment and evaluation proposed by Dunning (1977).

The teachers developing modules address both the full range of students and specific groups of students. This practice maintained some aspect of the undifferentiated approach of the curriculum in the following way. There are expectations in the writing of modules and the planning of these learning activities as to what a student at each level could do. At the end of the activity, there are expectations for evaluation of each student group in examples in the modules themselves.

At the time of implementation, those teachers who were part of this research (1992) had misgivings about the superimposing of the grade-level criteria on the evaluation of 14-year-olds and younger. Behind their opposition is the belief that continuous progress and evaluation are more beneficial to students. The modules examined in this research told the teachers how to assess students' work. The phrasing in a module is of this nature: This is how a level 5, 6 or 7, etc., would respond to the task at hand. Student evaluation had the characteristics of being both criterion-referenced and normative. This dual approach is similar to those intelligence tests, which provide a mental age that is then statistically related to an intelligence quotient. For the low attaining students particularly, this method does not recognise what students can do. From a criterion-referenced perspective, therefore, the education system did not attempt to change its approach in relation to student attainments.

By means of the modules, the MSC, as stated in its universal aims, intended all students to be accommodated (TVEI interviews, 1992). In reality, as discussed above, the professional educators maintained the same examination differentiation provisions that had been in place previously, a provision that serves the higher-attaining students (SOSB, 1991).

The above-noted curriculum and assessment changes further defined the role of the classroom teacher with respect to curriculum and assessment (SED interview, 1991). One of the functions of a teacher is to select the appropriate module. For the TVEI modules, there is direction to the

classroom teacher on the choice of methodology, maintaining some discretionary decision-making by the teacher.

During the implementation period, there was industrial action by teachers. One opinion is that this was the result of introducing inequality and differentiation into the curriculum along with Standard Grade (Chitty, 1986).

Most classroom teachers did not take up the MSC suggestion to use outside expert staff; rather, they considered experts to be outside resources invited to present an aspect of the curriculum. The lack of use of experts by teachers may be a reaction to this statement in the MSC criteria.

4.6.5 Installation By SED

Owing to the youth employment aspects of the policy concerns, the central Conservative government directed the funding for the TVEI to the MSC. Changes in the MSC policy, *A NEW TRAINING INITIATIVE - AGENDA FOR ACTION* (1981), only partly were directed to the secondary education sector. An important aim in the MSC policy (see Appendix B) pertaining to the projects is the mandate to raise the skill level and flexibility of the labour force and to provide training services to those entering the labour market. When this policy for youth was implemented the efforts of education and industry began to be integrated in relation to training. This continued through the certification of some of the secondary education modules for the 16-plus, which included work experience, through the new agency called SCOTVEC. Moreover, foundation students could attain some of the modules that qualified for SCOTVEC recognition.

The pilot projects provided curriculum from locally managed education to other Education Authorities in a quick and cost-effective manner (Gregg, 1976). Other schools could select modules that were integrated with other training structures outside the secondary school, and at the same time benefit from the monitoring and evaluation formerly used by the MSC and the TVEI Unit. The terms of the projects encouraged the variety of approaches in order to appeal to the 'varying abilities' of students and to include modules as part of the SED certification (TVEI interview, 1992). To clarify the direction of the projects, the criteria defined

further specifications. The curriculum modules were equally available to males and females, to include four-year curricula balancing technical and vocational and general education, as well as a work experience component. These objectives focused on the possibility of employment locally or elsewhere, with the goal of developing student initiative and problem solving (MSC, 1982). The provision for student assessment with progress reports was available through meetings with teachers and perhaps parents, followed by a written report. This progress report would include career and educational counselling.

As part of the contract, the Authorities were responsible for defining the involvement of personnel and the admission criteria for students within the projects. Bell (Interview, 1992) reported that students who withdrew or were truant were replaced in projects. Whether this continued after extension is unclear owing to the job action. One of the entry requirements for students was parental consent for enrolment in the curriculum. Whether this parental role is encouraged with extension is not known, although parents are generally included in education decisions. The intention of the TVEI programmes not to exclude other technical or vocational subjects that the schools had on offer at the same time, ensured a smooth transition to the SED courses.

The students included in the new programmes continue to be part of the overall school programme, but for accountability purposes were to be identifiable. Each Authority was to include about 250 students per year group over the four years, with the total in any one project to involve about 1,000 students. Whether these criteria are relevant for extension or installation is not known as projects could be in more than one Authority or school. This research did not address whether this co-operation continued. School size is a factor that determines whether a course is supportable. Since all subjects could include a technical component, thereby providing the extensive flexibility proposed by Munn (1977), the application of the previous criteria may vary by the curriculum.

In addition, the MSC indicated that industry could provide instructors who had up-to-date expertise. The MSC acknowledged that the legal requirements would depend on the arrangements made in each project. Bell et al. (1989) indicate there are problems involving industry and the TVEI's value on the labour market.

Some teachers, schools and Authorities see themselves as ahead of the TVEI in areas of their curriculum development outside the requirements specified by the SED (TVEI Interviews, 1993). The funding provided is an extra support of their efforts.

One of the problems moving from a pilot project phase to installation is the qualifications available. The qualifications that recognise student attainment are SCOTVEC, National Certificate, Technology non-advanced, general certificates at A or O levels, later a Scottish Standard Grade Certificate of Education, the Higher and Certificate for Sixth Year Study, and at the time a proposed certificate in vocational education. The MSC indicated that the Local Authority should provide a record of the achievements of the students for the new curriculum options.

The national guidelines of the MSC required local involvement in the operation of projects, including Further Education Colleges and industry, as the TVEI had a broader mandate than only secondary schooling. The TVEI's positioning at the local level with the MSC funding to the Local Authorities, rather than through the usual educational funding structure, means continued involvement outside the school may be unsupportable. The TVEI's new reporting relationship with the MSC retaining accountability for the aspect of the TVEI implemented in education ended. Before the completion of the pilot stage and the evaluations, however, the SED extended its technology curriculum programme across the national education system in an announcement (1986), the white paper *WORKING TOGETHER: EDUCATION AND TRAINING*. The conclusion to MSC funding was reported in the interviews. In the meantime, the TVEI had established a core with options that could occupy 30-60 per cent of the students' timetables.

4.6.5.1 The Role of Secondary School

The role of the local secondary school in relation to the TVEI gained prominence because of the delegation of implementation responsibility. This occurred because the MSC contracted with the Local Authorities to implement and to evaluate the TVEI for the secondary school-aged population. In addition, the new positions of the co-ordinator for each Authority and one co-ordinator in each designated secondary school raised their profile. Across the pilot projects, the network with an advisory group established high visibility for the initiative. So did

the co-ordinator and designated teachers within each school project. Sixty per cent of the added funding was for the personnel who increased the production of learning materials. These were in the form of the modules or learning units that shared the single format. These learning activities were not necessarily new. The teaching approach could be in the form of individual lessons, group work or with field work and activity-based tasks for solving practical problems. While neither the units of work nor the variety of teaching methods is necessarily new according to those interviewed (1993), their common format was. The activity in schools suffering from funding shortfalls attracted interest. Both political and professional control ensued because the MSC was the final approval body of the education-based system of development and primary approval.

This network of teachers was new, although discipline-based teachers' organisations in Scotland are not. The Scottish Consultative Committee on Curriculum (now Council) normally would advise on curriculum issues. Moreover, there was a link to this Committee through the Scottish advisory group. The development and sharing of the number of modules or teacher lesson plan materials on a system-wide basis through the TVEI personnel was considered new (SED interview, 1991).

Within the Authorities, decision making was delegated to the TVEI co-ordinators. These designated personnel acted as the link between the MSC and the Authorities' schools and teachers. The educators generally retained their autonomy in planning curricula within the module context. Sharing of information took place through the network, and in-service training occurred through this organisation across Scotland. Thus, the TVEI provided for flexibility through the local implementation and central accountability. The division of responsibility between the MSC and education was administrative, a partnership that provided for local ownership and action in the projects. No dislocation of either system occurred as a result of the organisation, since only the incentive funding moved across lines of administration. While Howieson (1989) criticises MSC's lack of educational expertise, the strategies and approaches it encouraged through its funding ended in education claims of more success with the low attaining students (SED, 1989, 1991).

4.6.6 Evaluation of the TVEI

One of the criteria of the TVEI was the provision for evaluating the

projects that were approved ((b)(iv), MSC Writ, 1982). A number of evaluation research reports have documented this innovation in educational practice in Scotland for both the MSC and Education (see Chapter 2). Bell et al. (1988) also provided an Evaluation Report for the Scottish Yearbook that discusses the practices, tensions and outcomes of the TVEI. They say that enhancement of other subjects with the TVEI modules is a Scottish notion. The flexibility allowed the principles of the Standard Grade and Action Plan to co-exist with the criteria of the TVEI. In general, a successful negotiation between the parties involved resulted in a successful initiative to which the extension announcement attests.

4.7 The New Technology Policy

In 1986, technology was officially recognised as a discipline by the education system. Schools that were not accepted into the projects were now required to provide technology curriculum without the extra funding, but within a per student flat-rate funding formula. The curriculum of an Authority contains the framework of subjects but may have some variation in content. Variation also occurs within the subjects. For example, Lothian list Technology Activities and Applications as a mode in Standard Grade and modular short courses as an option called Personal Social Development on its sample timetable. The latter course emphasises a more liberal approach to education than the more vocational technology option.

Since the TVEI produced more than 2,000 modules, Authority personnel, including the schoolteacher, can select the configuration within the required mode that now includes the new SED technology courses which may include the TVEI modules. In this way, teachers have a measure of flexibility while there is curriculum control by SED. The SED reported that those subjects where computers were in use to deliver a portion of the content would not necessarily be considered to have a technical module (SED, 1989).

Addressing the computer technology introduced through the MSC's funding, T. Conlon and P. Cope (1989) criticise SED's original introduction of computers to the curriculum. In part the traditional approach to curriculum was a factor but the fact that computers represent a new and fast evolving field is a consideration.

On extension, SED (1986) defined the new provisions for the study of technology. The new definitions extended from primary to the end of secondary. In secondary schools, technology became the eighth subject with this official recognition. The policy articulated the scope and sequence of provisions suggested by the SED. In that way, the SED effectively ended the involvement of the MSC in education, and educators regained control over technology education.

The aims of the new policy are to develop student awareness of technology and its impact on lifestyle, industry, transport, communications, employment and the environment (ibid.). Students are now to have experience in the technology of design and to be capable of evaluating the process of design in terms of choice, problem solution and equipment. For Standard Grade courses, the requirement is 160 hours over two years in one of the following: craft and design, computing studies, home economics, graphic communication, office and information studies, and technology studies. These courses are appropriate for the 14- to 16-year-olds. For the 16- to 18-year-olds, additional courses could lead on from these subjects, with some renaming as the emphasis changes. For example, Management and Information Studies may evolve from a emphasis on office practice to an emphasis on management. Certificates for the sixth year record student choices in courses in computing, management, information and technology studies. A National Certificate may be earned by taking the technology module courses that have a vocational emphasis and thus provide some flexibility and progression in courses.

Work experience that was a requirement in the TVEI is now controlled by the SED. The amount of time spent in the world of work is stated to be one week for secondary schools by the SED (1989). The work experience does not have to fit the student's intended career aspirations. This out-of-school experience now has a more general direction, for example, learning what the employer looks for in an employee. There is no consideration of integrating schooling and apprenticeships beyond the few modules recognised by SCOTVEC for apprenticeship at the secondary school level. Generally, for apprenticeship students need to leave school and enter the Youth Training Schemes or Further Education. For the most part, the education requirements of apprenticeship remain external to secondary schools and there the student can earn a wage if the employer can absorb the training costs. The descriptions of the

SCOTVEC modules contain general rather than specific apprenticeship skills.

The extension of the TVEI ended the experiment of the MSC in the jurisdiction of education. The new approach to learning embodied by the curriculum and modules were supported enthusiastically by those who were attracted to and had projects approved. However, the modular approach had a longer life in education owing to the reception and testing of the curriculum and modules as part of the TVEI.

The continued use of the SCOTVEC descriptors by teachers indicate their usefulness. One of the benefits of the TVEI was that for the first time there was some systematic pre-testing of curriculum content for these students. The form of the pre-testing in terms of attainments for all students identified previously by this research limits the discussion of relevance. Some curricula may be more successful for different attainment groups than others. Fortunately, all students could have a positive experience with the practical approaches if they were to select a module or an enhanced course, although not all schools may have these courses.

Bringing education into the technological age has a lasting effect. Some students, who themselves are enthusiastic about the high-end technology, will drive the future and ongoing changes. These students, the so-called 'high flyers', have access to computers at home (SED interview, 1992). Yet, this discriminates against the disadvantaged students without home computers. The analysis of the policy and implementation in the next section investigates why the curriculum took this particular direction.

4.8 Review of the Technology Policy

4.8.1 Introduction

The final stage suggested by Downey (1988) is a review of the Technology policy. Using the structure-functionalist approach, this research examines the political ideology, legitimacy and the functions of this multifaceted policy. Discussion of these aspects of the technical policy contributes to its evaluation and is the basis for comparison with Ontario in terms of the policy's inclusive principle and the consequences for low attaining students.

4.8.2 Political Ideology

At the secondary level, the policy emphasised relevance, i.e., the

development of skills for work 'across the ability range' (MSC Writ, 1982). Therefore, the development of the TVEI analysed here is for its adherence to that aim that was outlined by the MSC (MSC Writ, 1982; Appendix B).

First to be identified are the ideologies of the participants who initiated the policy and their use of theory in practice.

The political ideology that was prevalent in the UK before and during the TVEI development in Scotland was that of the Conservative Party (Ball, S., 1990). Their market ideology introduced further differentiation of students, elements of choice and diversity in the modules, competition for funds through applications for contracts, and restructuring of personnel and the modes of delivery. Achievement of these goals was through the funding and contracts. The wording of the criteria, 'testing ways of organising and managing the education of 14 to 18 year old people' (MSC Writ, 1982) being general enough to allow flexibility in the approved projects.

A belief the importance of computers prevailed, so a provision for high-end computer systems occurred with much of the remaining 40 per cent of the TVEI funding (SED, 1989; Conlon, 1989; Conlon and Cope, 1989; interviews: SED, 1991; Authorities, 1992,93). The interest in computer training encouraged by the MSC (1982) is central to the implementation of the programmes. Of the classes supported under the TVEI, 2 per cent of the range of modules accounted for 50 per cent of the enrolment and 28,037 enrolled in computer modules (SED, 1990). This means that control of the varied interests of central government, politicians and central administrators was necessary in order to achieve this enrolment. In technical modules in secondary schools, that entailed 37 per cent of the total TVEI enrolment.

Lawson (1986, cited in Ball, 1990) identifies differing ideologies among those at the centre of these educational changes in the UK. He claims the following. Politicians who represent the electorate in the central national government believe in market forces, value freedom of choice and promote independent schools. Their legitimacy comes from the governing authority. Bureaucrats (DES/SED, Authority Administrators, SQA) represent a belief in administration, management and system maintenance. They value efficiency and centralised control through

examinations. Their legitimacy comes from their professional authority as educators and as part of the governing authority. The professionals - head teachers and schoolteachers - represent a belief in professionalism, experience and practice. They value quality, promote an impressionistic evaluation with an authority based somewhat in the governing authority when they carry out decisions of the SED.

At first glance, this structure appears very clear-cut, but on further consideration, it does not account for the range of positions within the education sectors examined. The difficulty with this typology is that it may not represent all possible variations or mixed alliances. Overlap in Scotland occurred where the HMI related to Education Authorities that Labour controlled. This alliance with Labour challenged the authority and legitimacy (M. Hill and G. Bramley, 1986) of the Conservative central planning unit. As educators, the HMI had different interests, which were more similar to those of the frontline personnel and local school administrators than the political interests of the Scottish Office. The additional alliance between the HMI and teachers provides a view of the places where the ideological conflict occurred as the policy implementation moved through the different levels of the system to the front line (HMI interview, 1991). Therefore, what appears in the policy at the school level as implementation of the aim providing for 'across the ability range' (MSC Writ, 1982) results from meetings between the government bureaucrats and the TVEI co-ordinators and not the politicians. Such agreement presented a solid front to the central Conservative government because the educators in Scotland maintained their alliances (SED and Authorities' interviews, 1991,92).

Ideology, furthermore, raises other concerns. Hill and Bramley (1986) suggest that there should be considerations as to the level of legitimacy of the policy. The Conservative government market ideology, as one example, had to rely on the support provided by various public sectors, support that for the most part is not within education structures. In Scotland, many did not accept the legitimacy of the Conservatives, because the majority of Education Authorities support Labour and, hence, social choice before market choice (Authorities' interviews, 1992). The writers of the left referred to in Chapter 1 considered the MSC's intent was an attack on comprehensive schools and labour (Dale, 85,89; Chitty, 1989; Ainley and Corney, 1990). Consequently, it became necessary for the politicians to monitor the

alliances within the Scottish education structures for both control and flexibility.

To add to this challenge, there is a sector outside the legitimised hierarchy that has no place in this construct. That sector is the students, who are not yet voting and who are the object of the government's policy. Technically they are represented by the politicians who were voted into office by their parents. However, in Scotland that means Labour in the Authorities and Conservative in the Parliament. At the same time, the professionals claim to have the students' interests at heart. In some instances, student withdrawal from school may be an indication that the curriculum is inadequate. Given the changes made on behalf of students, there does not appear in the TVEI or related documents any clear statement of their right to a relevant secondary education or to an evaluation of their response to the new methodology (Beck and Black, 1987). Saunders and Halpin (1990) indicate that the training which the MSC funded is narrow for isolated and subdivided tasks, and served mainly unemployed school leavers while not responding to the changed economy.

4.8.3.1 Legitimacy of the Policy Approach

The scope of this analysis leads us to inquire: What is the basis of the technology policy established by the MSC and enhanced by SED? We recall these operational criteria: to provide more students with qualifications for work, enabling them to solve practical problems, using work experience and involving industry. The SED agreed to the MSC descriptors. However, the contracts do not outline how the SED or the MSC achieve the employability aim; the contracts claim only to define the delivery of the modules outlined.

The aim of the TVEI expressed in terms of employability is not the domain of the educator. When the approach to the TVEI was formed at the Authority level, it was in academic terms for the modules according to the administrators (1992). The TVEI did try to change the underlying structures of how schools work in relation to industry through work experience and how to prepare for the non-academic student better for work.

On the one hand, Munn describes the understanding brought to these students in this manner:

> A particular factor to be considered in the case of the less able pupils is the balance between content acquisition and the development of skills: one feature of these pupils is that their powers of retention are often low, and time devoted to developing usable skills is more likely to be profitably spent... (Munn, 1977; p.44)

On the other hand, it is questionable that the TVEI should frame education for the less able students in academic terms. Student attainment of skills supposedly appears with the attainment of a module. An example of one such skill is to answer a job advertisement with an application (TVEI module document, 1993). The evaluation contained in this module indicated that foundation-level students would be unable to produce an acceptable application. One must ask, then, why schooling for these students is defined in this way rather than through specific skills for a job. Not only would this approach improve their employability but it would also increase their confidence for the world of work. It is clear that the curriculum and skills taught have no direct relationship to the labour market.

While questioning the assumption that funded projects can improve the way that low attaining students are prepared for their future, it is useful to consider the implications for these students. The conceptual base of educational policy is an abstract point to analyse. Its definition has benefit for the evaluations and subsequent policy development by clarifying what the education system expects of its the low attaining student.

In terms of opportunity for all students to receive the same consideration for attainment and a certification that has positive social meanings, Dunning comments:

> There is nevertheless a danger that certificates indicating low achievements would not be granted status by users, including the pupils themselves (1977; p. 39).

Recall that Bell (1988) found that employers did not recognise to the new certificates with the SCOTVEC modules.

The TVEI evaluations of the modules generated could have illustrated the choices available for decision making. For example, Paterson (undated and unpublished) explains that project 'A' had better results than project 'B' for 'across the ability range' because of enrolment. A further comparison of the modules' content with similar student enrolments could have determined which modules offered more opportunity

for certification of the low attaining students and were thus ultimately related to their employment. The question of what will the student be capable of doing for employment is not addressed by the TVEI administrators' interviewed (1992) or in the application process and, therefore, is not identified in the evaluations. It is assumed with the acquisition of a SCOTVEC module the student becomes employable. Authors such as Flinn (1987) would take issue, claiming there are no jobs. He argues that vocationalism displaced equal opportunity with a goal of making students better employees and legitimising social divisions. He encourages critical engagement to maintain the comprehensive schools and principle of students' needs as citizens.

4.8.3.2 Legitimacy of the Practices of TVEI

At the outset it must be realised that the curriculum presented to the TVEI students varied from that presented to other students, in that 10 per cent to 30 per cent, of the TVEI programme is devoted to technical education (SED, 1989). The remainder of the programme followed the recognised subjects, which also may include enhancements by the TVEI. The use of technical equipment included along with methodology such as problem solving gained wide acceptance throughout the curriculum. Such practices, if controlled by educators, are in keeping with the intent of TVEI according to the SED interviewees (1991,92). Enhancement continued in other subjects after extension and after definition of technology by the SED.

In the HMI report (1989), it is noted that one project had been terminated on the initiative of the MSC, an indication that the final decision was controlled by the MSC. Two opinions expressed regarding this matter are first, that there was a new senior administrator, and, second, that the Authority could not fulfil its contract. This termination, a serious action, raises the question of how conflicts are resolved in the MSC and the SED and between them.

The interviews of the key SED and TVEI personnel (1991, 1992) failed to clarify how the funding of personnel to develop modules using the MSC descriptors is in the best interest of all students including the academically disadvantaged.

It is known that the MSC had conducted research (MSC, 1985) and its personnel had in-service training on the German model (MSC staff report,

1991) with its two elements, schooling and paid apprenticeship. Elements of that model appear in the aim and the acceptance of SCOTVEC modules as:

> (a)(vii) there is a close collaboration between local education authorities and industry/commerce/public services etc., so that curriculum has industry's confidence. (MSC Writ, 1982)

The SED, the Authorities, and teachers did not necessarily accept the idea of schools working with industry and together with labour. According to two school personnel the extent of the involvement with local business is an annual meeting (interviews, 1993).

Traditionally, industry and labour interests have been at odds in Scotland; only in a few instances, such as worker-owned industry, are new relationships formed. Ideas of mutual benefit are not part of the context or culture. C. Bell's characterisation of the industry-education relation as "Liaison Dangereuses" (1988) is an indication not only of the environment but also of the need for improvement.

In their evaluation of the TVEI, Bell et al. (1988) credit the technical and vocational initiative as:

> catalyzing, reinforcing and systematising the scattered initiatives of industry and schools relating to each other. (draft, Chapter 8.10)

Hence, the relevance of the curriculum increased in relation to the previous provisions. The authors continue by noting that the MSC accounting required the TVEI cohorts to be identifiable. However, with extension in 1989, this was no longer possible. The plan to have students participate over four years, owing in part to the school leaving age, was not realised, and the TVEI did not sustain student interest in staying on in school (Paterson, undated). To continue to improve the circumstances of the non-academic students would require accountability measures that could assess the effectiveness of changes to their schooling.

Bell (1988) addresses the difficulty of delivering the education component of the education-industry activities. In his view, the problem rests in mixed-ability classes, which are made up of some students who are interested in staying on and some who are not. He also noted that students did not get an insight into the role of industry and commerce, a major lost opportunity to develop the industry links for students.

There is no discussion of providing more industry experience or allowing students to learn by doing as a solution for those who do not wish to stay on. It may be argued that this is what the various post-secondary options offer, but opting for the youth training schemes means abandoning schooling in exchange for providing temporary employment. The long-term issue of employment and participation remains.

The uneasy relationship between the two government departments, the MSC and the SED, reveals how such departments work together or against each other within the same governing structure or strategy. Similar opposition is found within departments as well: for instance, the TVEI is an example of the SED's political role being at odds with its managerial and professional interests (SED interview, 1992). To address the issue of unemployed youth when the number of jobs is declining requires the co-operation of those agencies with a youth mandate as well as the involvement of youth.

Some conflicts result from shared meaning and linguistics (Ostram 1976); others are due to real differences (ibid.). With multiple experiences mediated by language, the work-related skill concept assumes definitions expressed in a variety of ways, giving the impression at times in the interviews of differences. In fact, there may be no differences or such small variations that those differences in practice would not be important.

The issue of certification outcomes was put forward by the MSC and through the contracts to all the participants. In the document *Learning and Teaching in TVEI* (SED, 1989), the criteria used to evaluate the applications did appear as cited previously and they became part of the curriculum structure that is assessed. While Howieson (1989) suggests that the MSC did not have expertise, it is the MSC's descriptors, the use of modules along with its methodology that SED used for the students. The MSC programmes have these same students after they leave secondary school.

The need to expedite the applications is evident in the criteria. The short time allowed limited the possible outcomes for students (Gregg, 1976). This may explain the failure to follow up to find if students found employment. When it came to evaluating competing application forms

for the projects, the MSC internally made the decisions about the balance in the curriculum as one aspect whereas other aspects are not open to discussions. The successful Authorities apparently dispersed the funds in the approved way, although there is a report of unspent TVEI money being available in an Authority as late as 1996. It is unclear how the job action influenced these various developments.

A range of interests represented throughout both the MSC and the SED wanted to demonstrate change in the outcome for the full range of students. The MSC and the SED acceptance of SCOTVEC modules as part of the curriculum provided the work skills for all students was one change where there was co-operation. There would be no barrier to taking the curriculum or modules, but as Paterson (undated) and Raffe (op. cit.) point out, that practice may not have been logical given the structure of courses and choices in relation to each other and the acceptance level of the new courses. For example, taking a TVEI course meant that one less 'highers' course would have to be taken (Paterson, undated and unpublished).

4.8.3.3 Legitimacy of Using Funding for Personnel in Implementation

Competition for the funds represents another difference between the central government and the Local Authorities. Most of the Labour Local Authorities did appear to support the competition for project funds, which was the most evident aspect of market ideology, according to their personnel (1992, 1993). Before the TVEI, all students received education benefits from equal funding, and with extension the system reverted to the use of a basic rate, thereby rejecting the approach.

Furthermore, in accordance with market ideology, there is no question about the quality of the education product from the Authorities represented by the modules for parts of the student body. While schools develop curriculum modules for delivery to all students, there is no real choice of modules by the students as the modules may vary by school.

Concepts of market and social choice introduce notions of the quality of the various modules. Not all students are able to attain the stated learning outcomes of modules because of their differing abilities. However, the possibility of longer work experience or learning-by-doing' is unavailable for these students to reinforce usable skills (Munn,

1977). Often the basis of the objection to work experience and other aspects of "vocationalism" is that the purpose of education is solely the love of learning and advancing knowledge without considerations of the marketplace. Other goals such as citizenship and socialisation do not receive the same consideration, although some lessons serve these many purposes. In fact, valuable relationships between all aspects of schooling, both ideologically and in its practical ramifications, were raised with the TVEI (SED, 1991). Legitimacy reflected in the accountability processes could have drawn attention to these wider ranges of the student outcomes. Because the emphasis was mainly on the development of curriculum modules, that one aspect assumes that the employment problem for low attaining students will be resolved with the improvement in access to certification. While Bell (1988) draws attention to the acceptability of the certification by employers, no further adjustment was made by either the SED or the MSC .

The funding mechanism limited the research through the elements of the proposal. Challenges to the MSC-framed response are with its suitability to achieve attainments and employability. The interpretation and the extension by the SED made universal provision for technical education. Extension did not state attainment goals or attend to the outcomes of 'across the ability range', particularly the outcome of employable skills for the low attaining students.

No questioning appeared about the equipment renewal in a variety of classrooms, which used some of the funding for it. However, the majority of the funds (60 percent) applied to additional personnel to write and deliver the TVEI modules. Generally, these personnel designated and paid by TVEI wrote the curricula and modules in much the same way they had done before, according to eight TVEI personnel interviewed (1992,93). The inclusion of industry, as suggested in the MSC aims, was not extensive. Bell (1988) indicated that industry did not know what it wanted in relation to education, since employers used their own schooling experience as a reference point. On the acceptance of meeting with industry, effective control of the TVEI was by the network approving the curriculum and modules. The Scottish advisory body established with the TVEI administrators and its personnel network controlled the MSC by and in the secondary school curriculum. These personnel developed the in-service training of schoolteachers in the technologies, which ensured consistency in spite of the flexibility that

was possible with the new curriculum materials. Both consistency and flexibility appear with the decision making that shaped the TVEI but the belief that there was real change in the circumstances of low attaining students is another myth of Scottish education. Supporting the view that the TVEI made a difference allows the underlying labour market issues to be ignored (Flinn, 1987; Ashton et al., 1990). The funding did not generate a challenge to the status quo or question the future for the low attaining students other than, as P. Weston (1984) describes it, 'learning their place'!

As for the final impression left by the funding, project site teachers commented on the benefits of the funding, saying that it allowed many schools to buy state-of-the-art computers (Authorities' interviews, 1993). The TVEI members identified the following issues (Questionnaires, 1993): the lack of ongoing funding for maintenance; uneven distribution and access of students to the new programmes in the early phase; unequal positioning of departments and schools into 'haves and have nots'; political divisions, which is always present, between all levels within the structure, but became more polarised; variation in community involvement; and variation in quality of modules.

The following example illustrates one of the dilemmas of the approach, according to a member of the TVEI staff (1992), one early project school presented part of the normal syllabus or curriculum for the TVEI funding. The redefined curriculum became a new-enterprise project and received funding. The activity and approach were modified to fit the requirements of the application process. Since the spirit of the actual policy had been deflected, the project was not really creative or innovative in this example. The teacher thought the project had little to do with technology, but because the curriculum appeared to have an enterprise approach, it was accepted. Two other TVEI personnel recounted similar situations (1993).

Turning now to the funding for the training of secondary school students (future employees) provided on behalf of prospective employers. The funded training did provide these students with computer access (SED, 1991; TVEI school interviews, 1992), and ultimately, the students became available to employers as employees trained in computer and other job-related skills (Bell et al., 1988). However, the SED (1991) reported that 29 per cent of students withdrew without completing their module.

While the interests of the MSC were specifically to relieve unemployment, the MSC extended the provision to include skills for all. The one-module format for all students represented promoting the interests of all students. However, it was mainly those who were academically oriented who attained certification (Paterson, undated). It is not being argued here that the interests of the academic student should not be provided for in the TVEI, but that the TVEI should have equally benefited the rest of the student population and been relevant to their gaining certification for work-related skills deemed suitable for a job.

The acceptance of the modules by schools dealt somewhat with unemployment issues and offset the wider public debate about the economy and its performance in the following way. Holding students for four years in secondary school keeps them out of the labour market; consequently, the numbers of unemployed youth decreased, thus giving the impression that the TVEI and the MSC was effective. It is important for the public to debate these issues as they manifest themselves in schooling for all types of students. That debate is not evident in the policy documents (SED, 1991). In addition, the ongoing issues of technical innovation, which reduce employment, are not subject to planning efforts or discussion in the wider community.

In exchange for staffing, the SED provided a strategy to address the mandate of the TVEI, which fortunately allowed for the various professional parties involved to satisfy the political agenda. Their bargaining formed the contractual agreements and framed the incrementalism visible in technical education.

The next aspect of legitimacy to be examined is the interplay of the political processes between the central and local agents, the way the various personnel related to each other, and their interest in working in a co-ordinated fashion. The MSC had an advantage in that it controlled the funds. The Authorities needed to make the projects successful to obtain and maintain the funding. They became allies of the MSC through this process because the MSC needed to demonstrate to the government its effectiveness (Shirley, 1991). For the TVEI, there was no open conflict because the curriculum and modules allowed both parties: the MSC and the SED, to agree and appear to have achieved the policy

aims. By presenting the content of the modules as new in order to address the MSC aim of 'across the ability range', the SED maintained its internal structures by agreeing to the external SCOTVEC certification of the modules. While on the surface this may appear to be a 'win-win' position for each, the aforementioned certification outcome for the low attaining students remained at issue (SED, 1991), because most of these students do not go forward to employment (SOSB, 1991).

The funding that established the staff network with its information-generating capacity, was crucial (Gregg, 1976). Composed of staff with divided loyalties and differing motivations, the newly funded network generated information in order to make the TVEI a success. The members of the TVEI network exchanged experiences as they formed and delivered curriculum and modules on behalf of the MSC (Downey, 1988). Some decisions appear to have been shared, as were the problems with the TVEI. The network became a wide resource to tap for solutions to problems, thereby improving the decision making.

The wide support for decisions taken deflected any criticisms (Authority interview, 1992). This approach to implementation satisfied the needs of the participants by establishing a professionally supported structure for providing input. The exchanges between all levels of the organisation meant that some flattening of the education hierarchy appeared in the initial stages when problem solving was a priority, and staff at all levels gained access to each other (TVEI interviews, 1993).

The many facets of policy examined in this analysis of the TVEI can partly explain the policy developments, but no one approach accounts for all the events. Additional considerations not covered centre on interrelationships between theory and practices. Not accounted for are issues such as justice and fairness for all students at a time when education options and informed choices were being allowed.

How did the decision making contain and control these issues throughout the organisation? Though we have a partial explanation, at another level the question remains how a lower level in the TVEI hierarchy had its agenda advanced ahead of that of the Conservative governing body. The seriousness of negating the intent of the legitimate central government in a democracy is not minimised by the satisfaction of the parties involved. The additional point that disbursement of public funds with

the specific purpose of enhancing the employability of all ability groups adds to the concern regarding the control that the professionals exerted. The policy statement increases the rights of the students to the opportunity for certification and employability. What actually occurred in the schools represents the extent to which the Scottish professionals accepted the Conservative, or the 'English' solution for Scottish education in terms of vocationalism (SED, 1992).

A second explanation is the deep commitment of academic staff to the national academic emphasis to education (Authority interview, 1992). In the discussions among the staff, expectations for implementation are defined and agreed upon (SED, 1989).

How the MSC policy was extended into the education system and student education through the funding mechanism informs the policy makers and illustrates how the educational economy works throughout the system. The way in which the public service at all levels held the TVEI accountable for 'across the ability range' sends a cautionary notice to the policy makers also. The use of the comprehensive schools, mixed-ability classes and now differentiated curriculum gains support in the belief that this positive discriminate is fair. Elitism is one explanation for why no further challenges are made when there are no embedded concepts of equity with regard to employability. Here, the Conservatives and the MSC, which in fact represent elite interests in this policy apparently, advanced the opportunities for all students. From a theoretical perspective, this is unexpected. At the same time, the attainment outcomes in effect are minimal for all students, as previously noted by the TVEI evaluation research discussed in Chapter 2 and by SED (1989). The interviewees (1992, 1993) failed to explain how or whether the committees addressed this issue and the question of employability during the planning and evaluations. Time is one factor but one would expect ongoing debate. According to Croxford et al. (1991), the use and take-up of modules suggest that the staff addressed equal opportunity and the attainment of work-related skills and sounds as if those attached to the TVEI are satisfied with the results. It is likely that the ending of the special funds also ended the interest in promoting the employability of these students.

The dynamics of this education system demonstrate non-linear characteristics (Fullan, 1992) at the same time as providing a rational

for changes. The multi-layered approach to the policy and its implementation reinforce the conclusion of Hawthorne's 1930's study that demonstrated how staff control their work when external change is attempted. The incompleteness of the evaluations, even taken together, to account for the outcome of implementation is a concern.

4.8.3.4 Legitimacy of the Curriculum Approach

For the mandatory years of schooling up to age 16, the system appears universal since the number of years is the same for all students. Yet schooling that does not provide an appropriate curriculum for all students cannot be considered as universal according to the position of equity taken in this thesis. The benefit of attainment as certification is, therefore, limited both within the mandatory years of schooling and later when schooling is not mandatory.

From the inclusion perspective, education should provide equal benefit to all students, meaning that all students have access to both the same number of years of education and appropriate curriculum with certification that would make them employable. This position addresses the unequal benefit that low attaining students now derive from the provisions, both during the mandatory years of schooling and afterwards. The SED reported that in 1982 the then current approach harmed forty per cent of students. Because SED with SQA maintained the ranking that means one can only conclude that these students continue to be harmed.

Distribution of certification to the non-academic student was one of the original intentions of TVEI, which institutionalised certification of work-related skills. But since the TVEI's attainment criteria favoured high attaining students, it did not necessarily provide the education and industry components that would lead to attainment and employment for the low attaining students.

The extension of the TVEI in Scotland mandated in this way by the SED suggests that each level of government sanctions the strategy. Essentially, the SED maintains control of the students' outcomes since learning-by-doing is unavailable at the level these students may require, more time to attain certification is unavailable, longer work experience or apprenticeships are unavailable with the structure of secondary school. Therefore, the basis of education is in part on services that only at first glance appear universal in their present

forms. Paradoxically, education is redistributive in favour of those designated special needs. This form of redistribution serves students equally, but differently. It does not focus on the benefits that, by default, accrue to the higher achievers because of the academic interpretation of what constitutes a relevant education for all ability groups (Munn, 1977).

Nevertheless, secondary school continues to select out forty per cent of the students. Maintaining students in secondary school intended to increase the relevance school through the TVEI for all students, yet Paterson (undated), Bell (1988), and Croxford et al. (1989) did not find this in their evaluations.

In TVEI, more relevant technical provisions attempted to increase staying-on rates so as to make students more employable. It is not known whether early school leaving favoured employment for Scottish youth, as Ashton (1990) found in the UK, owing to the number of jobs available and the contractual process not tied to employment. The extension assumed universality, but the low attaining could not attain some of the modules.

Nevertheless, a description of the structures and their functions that dominated implementation, does not explain why the employability issue was abandoned. When educators were asked about alternatives considered within the projects, 100 per cent of the interviewees (1991, 1992, 1993) replied that they and their education system did not differentiate among students to enhance their attainments even though the new structures were being implemented. It is not known why they did not admit the differentiation that was in fact taking place. While they viewed all students as equal, at the same time they also acknowledged and accepted the fact that all students were not benefiting equally. The interviewees did not mention the differentiation that the Dunning report introduced, though it may have been too early for them to realise its intent or the reporting that maintained the ranking. These points will continue to be examined on the basis of information obtained from the questionnaire.

4.9.4. Functions of Technology Schoolteachers

My final method of evaluating the impact of technical education is based on the results of the questionnaire and a second set of interviews conducted in 1993, ten years after the first announcement of the TVEI,

in the fifth year of Standard Grade and its third year being examined (SED with SQA, undated). The emphasis is on the technical and vocational (TVE) schoolteachers' roles in implementation, namely planning, school-level policy, programme and promotions (Broadfoot, P., 1979).

The first four items (Questions (Q)1.1 to 1.4) ask for information about the respondents. The most frequent respondent was the assistant technical and vocational education (TVE) head teacher. One hundred per cent (N=52) of the respondents said they had a degree. These specialised personnel had between 16 and 25 years of experience in schools; hence they are well onto their career path. Whereas the TVEI network is outside the normal career path, Howieson (1989) says it provided alternative careers to schoolteachers. The new positions had existed on average for nine years or since 1984. These TVE personnel were able to introduce change at a faster pace than the SED (ibid.) perhaps because of the experimentation that it encouraged in the aim.

The remaining questions (Q 1.5 to 1.18) address aspects of the planning at the school level directed towards the low attaining students. In the school, the TVE co-ordinators participated at two levels in TVE. They were part of the Scottish network and they implemented TVE in their secondary schools. The curriculum structure controlled the introduction of TVE by these personnel at the same time as the planning format of the modules and curriculum controlled them.

4.9.4.1 Planning

The planning role of these specialised teachers, who controlled the TVE school personnel and their activities, is how TVE actually entered the school. (Miles, M., 1978, cited by Fullan, 1982). Fifty-two of the personnel who responded to this questionnaire had teaching duties for about a half of the school day (Q 1.5), thereby limiting the planning time. Meetings and administrative duties took up 25 per cent of the remainder of the school day. The staffing level for TVE was often determined by the size of the school.

According to the questionnaire responses (Q 1.6), these teachers spend little time dealing with articulation or co-ordinating the scope and sequence of programmes from primary to secondary schools. This issue of curricula scope and sequence is of concern to the SED (1989). Schoolteachers assume that the Scottish Curriculum Committee (SCC, later

Council) deals with this issue. Since each school may vary its curriculum in response to local considerations, there may be more flexibility, or less consistency, between schools than thought. TVE interviewees claimed that the modules used are shared (1993). An indication of the effects of this point may be seen in the SED report (1989), which states that some curricula and modules are duplicated and that students had to repeat modules at subsequent levels. This redundancy is said to be boring and a waste of the student's effort. For other modules, rapid changes in information and in computer-based studies necessitate continual updating of the grade level of all subjects. Schoolteachers' main interest is on activities that benefit their schools. While there were only a few meetings with the primary school teachers, almost half of the secondary schools held meetings between teachers of the various grades (Q 1.7).

The implications for schooling are that each level in the schools is unaware of the programme at the previous and subsequent levels. The scope and sequence of the curriculum have the most impact on the high attaining student when moving them forward in independent studies. Problems arise for the low attaining student because they are exposed to a curriculum at higher levels of difficulty for them before they have succeeded at the lower levels at this time.

The most frequent subject of the meetings was student timetables (Q 1.8), although the HMI (1989) indicated the need for planning.

The guidance staff and the TVE co-ordinators have the most responsibility for students (Q 1.9). One of them is usually assigned time-tabling (coursing) (Q 1.10). The teachers' impression of a student's ability determines the level proposed for the student's curriculum within the constraints set by SCC. The secondary school generally takes the recommendation of the primary school.

The planning of a student's programme involves discussions with the student and parents in 37 of the respondents' schools (Q 1.11). Placement is based on procedures for students with identified needs, but it is informal for low attaining students. In some schools with classes that have been 'set', planning for placements is a matter of organising the ability grouping.

Overall, the curriculum programmes offered in Scotland's secondary schools that are 'mixed ability' usually mean that the foundation and lower general-level students are in one class and the higher-general and credit-level students are in another class. In small schools, all are together. This organisation does not imply that all in-class activities are 'mixed ability'. The respondents say there are some accommodations made for ability in the organisation of classes and the curriculum presented, but not for the full range of ability.

The differentiation of students does occur at the planning stage in schools. Group 'setting' within classes is such that low attaining students known to classroom teachers receive curriculum suggestions as to how to proceed with their subject projects. Formal identification of these students occurs with nationally set examinations. The designation of foundation students follows with the assessment of the courses the students are taking.

As mentioned previously, part of the planning process requires that teachers advise some students not to sit exams. In fact there is a large school leaving of students from schools that result from the teachers' impressions of students' ability and their choices. Because low attaining students and some special-needs students' are excluded, the test results are biased. Adding to this effect, some students attend special schools or other schools outside the secondary school system; therefore, the test results that determines student designation as foundation skew towards the right or higher end. In other words, the tests do not target the normal student population. The question of legitimacy of designations also occurs because the tests are not solely criterion-referenced, that is, exclusively ignoring the results of other students (see Chapter 2). There is a total absence of any emphasis on students' capabilities both for curricula content and examination.

The interviewees did not express concern about the inherent bias of the system and seemed puzzled by my interest in provisions for the low attaining students (TVE interviews, 1992, 1993). Some acknowledged their cultural bias and acceptance of the current structures while others expressed an interest in alternatives that provide more for low attaining students. The discussions in Scotland regarding publication of examination results appear to entrench the emphasis on the number of highers 'produced' in each secondary school (ibid.).

Although students and parents are involved in programme planning with TVE, schoolteachers are more concerned about the rating of schools in relation to their population, a practice introduced in the early 1990s. Since school inspections based on these examination results put pressure on teachers to improve results, teachers expressed concern about how to improve student performance. At this time, no teacher in-service training addressed this issue or examined alternatives.

Planning did take into account provision for changes to the curriculum when students had difficulty with their programme of study (Q 1.12 to 1.12.2). The curriculum policy determines the general provisions but the respondents stated that decisions about curriculum were influenced by ability (N=13), followed by availability of a course and career options. Consultation, negotiation and 'not a problem' are the opinions expressed regarding the issue of problems with programming. One respondent wrote

> no-one bothers - pupils are put into slots. It is more important to have them in slots.

Individual assessment (Q 1.13) is an option that almost 35 per cent of the respondents use to understand the students' difficulties. However, 25 per cent did not reply, and 40 per cent said that 'nothing is done'. The assessment provided is most often by the classroom teacher (62 per cent) who then makes a designation of ability by level. This appears logical because the teachers deliver the TVE programme and justify the accommodations in curriculum. On the other hand, there may be biases in the perceptions of teachers regarding student ability and, therefore, their evaluation. Learning resources provide 33 per cent of the remaining assessments while psychologists provide the remaining 5 per cent.

Generally, schoolteachers say that the designation of foundation cannot be appealed (Q 1.14.1), but in some few schools (N=5), appeal is allowed, suggesting some limited questioning of the designation process. There was no indication that the special-needs process was used. In Scotland, students have always the right to an undifferentiated curriculum in the past, which is understood as equal treatment by publicly funded education before the Standard Grade. This form of equality has been described as the 'myth' of Scottish education (Raffe, 1984,88; Flude, 1990) as only the 'deserving' pass examinations and now

it is unclear what the schools will provide to ensure fairness.

The statement provided to students indicates their predicted performance but may be adjusted 'if warranted' according to some respondents. The teachers reported that the fact that the Authority pays for the examination puts pressure on them to present only the more successful students and discourage the less successful. The cost to the Authorities has been inflated by the practice of encouraging some students to take examinations at two levels rather than just one examination, which would place all students on a developmental continuum. Teachers indicate that there are three aspects to dual examination: first, it provides opportunity to those students on the borderline of a designation; second, it avoids differentiation; and third, it justifies the unequal opportunities that are offered to students as a result of the examination. TVE respondents and interviewees (1993) thereby define their idea of fairness. Because students of this age are easily influenced by the opinions of others, they may accept the designation unquestioningly. In fact, acceptance of this lack of opportunity in general is part of this culture with its roots in the class structure (Authority interview, 1992).

The network system, established with TVE allowed 75 per cent of schoolteachers to work across disciplines and schools (Q 1.15) with the planning of curriculum their main duty. According to authors such as C. Clark and R. Yinger (1980, cited by Fullan, 1991) teachers usually work alone and so the network may have overcome this problem in Scotland by providing a co-operative approach.

The fact that in the project stage TVEI had funded additional personnel also allowed for students' progress to be checked across subjects (Q 1.16) as part of teachers' functions (Fullan, 1991). Usually (63 per cent) the guidance teacher did this, followed by the classroom teacher (18 per cent) and the learning resource (16 per cent). This is a means of identifying students with difficulties. However, since the following of students' progress became informal (Fullan, 1991; (Q 1.17)) teachers say that they inform pastoral services when a student is in difficulty or they need additional background information. The problem with relying on informal networks is that biases and norms may determine whether a student benefits from being discussed. The results may have a negative influence on understanding the student.

The next question (Q 1.18) explores this aspect further. The method of letting the school know that a student is in difficulty is to alert the guidance personnel assigned to the year group. The opinion was expressed that this is a slow process, as is obtaining special needs services. One respondent noted, 'the system does not work - too much time goes by before action'. The delay in referrals often extends beyond one term, which leaves the vulnerable student too long without the necessary assistance. The most common reasons for bringing a student to the attention of other staff were behaviour (39 per cent), lack of effort (33 per cent) and learning problems (28 per cent).

The next three questions enquire into the respondents' understanding of low attaining pupils (Johnston, 1991). The reasons given most often by teachers for students not doing well are neglecting assigned work (59 per cent) and attitude problems (41 per cent), (Q 1.19),(More than one reason could be given). These evaluations locate the problems as residing within the student (Johnston, 1991). However, ability may or may not be the issue. The next group of responses appear to provide a contrasting view.

Teachers indicate the student who is not achieving has problems with communication, listening, writing and reading, or problems displaying lack of confidence. The teachers clearly describe these students as having a specific learning difficulty, along with behaviour and attitude problems. None of the interviewees suggested that the relevance of the curriculum to the learning needs of the student as a factor, although on the questionnaire curriculum suggestions are made (see programme section).

The reasons for non-attainment are multiple, interacting and complex according to 70 per cent of the TVE teachers (Q 1.191). Fullan (1992) speaks to complexity as one factor, along with teacher overload, lack of policy clarity, incompatibility of policies, lack of capability of the education system in total and limited resources. Other policies of the SED specify certification outcomes for ability groups. The TVE planning for certification that could lead to work did not address specific outcomes. However, the certification planned for in Scotland is not viewed as leading to work but an indication that these students are not capable in relation to the 'highers' examinations (TVE interviewees,

1993). Bell's (1984, 1988) discussion of this point is that the employers still value the education system that they recall, and therefore the new planning structures never changed the context of their opinions or those of the public.

In general, then, the lower attaining students did not benefit from any separate planning at the school level according to the questionnaire responses (1993). The consideration of students in this group are subject to overall structures with individual referral to pastoral services and guidance. The TVE teachers have a clear picture of these students. Attitude is the main factor identified by 41 per cent of respondents influencing attainment (Q 1.92), followed by ability (33 per cent) and absence from school (26 per cent).

The respondents did not question the relevance of the programme, although the fact that they made programme suggestions (Q 1.20), appears contradictory. The suggestions which are not specific to TVE, but school-wide, are for more short courses and modules; specifically tailored courses; more guidance and case conferences; lower class numbers; greater access to work shadowing; more team teaching, co-operative teaching and learning support; more monitoring and encouragement; early identification; negotiated and staggered targets; and better liaison with parents. Some of these suggestions may be due to previous funds available for 'enhancements' across the modes and beyond the core mode of technology.

4.9.4.2 School-Level Policies

The questionnaire addressed as well the policy that operates in the schools in relation to all ability groups, including the lower attaining student. The in-school policy is the subject of the second part of the questionnaire; it consists of seven main questions. Since technology enhancements can be part of most school courses, at the school level the policy is part of the policy and procedures about which all students are informed. This wide interpretation of TVE means that diffusion of its effects is across the school and not necessarily focused on those students who are in the process of leaving school without certified skills for work. The SED (1989) indicates further that solely adding computers to the study of subjects did not constitute technical education.

Schools in Scotland generally do not have statements of purpose (Q 2.1), which both M. Rutter (1979) and S. Sarason (1991) consider to be an important indicator of success. Without such a statement the teachers may not share similar goals and may work independently of each other. The role of the TVE personnel is defined within the course definitions together with the course selections and the links between year levels and levels of difficulty. The TVE personnel say there are specific procedures for student participation in the school, and that students understand clearly how to move between levels, and what to do when they are not progressing or have difficulty with the curriculum. Frequently, the movement between levels is downwards because of the student attainments either in class or on examinations, or because students are supposedly encouraged to reach higher by taking examinations at two levels.

As a term of the contracts, curriculum development involves TVEI teachers, the community and industry for the determination of relevant curricula provision. The community involvement is limited in some schools to one meeting a year. The teachers only occasionally involve parents in this process. The involvement with the community provides the work-experience placements and is a critical area for development. The wider economy and employment in the communities were factors in the development of this aspect of the initiative, according to TVE interviewees (1993).

The system-wide policy discourages repetition of courses or taking longer for a course, for student movement is by age. A student may appear to continue on with school work from the last year or term, but in fact to complete previous term work is difficult while managing the new term work, So the student falls further behind. One attempt to keep the student with his or her age group uses in-class learning support. Most teachers acknowledged that it becomes an onerous task for them and students when there is no flexibility in this time- and age-based attainment structure. The problem which was also raised in TVE interviews (1993) is one that they handled through special needs or, in some cases, informally. Another area teachers are most interested in is behaviour codes, since adolescent behaviour is frequently a secondary school issue. Other issues such as school linkages, curriculum and professional issues were of sufficient interest for staff to become involved.

Teacher involvement, an indicator of interest (Fullan, 1991), in school policy is the basis of the next question (Q 2.2). Teachers are less interested, according to the results of this questionnaire, in procedural rights for students, appeals or attainment criteria. This reflects the school culture in Scotland, which attends to these aspects of equity and rights of students mainly for those with special needs. The professional network (TVE interviews, 1993) establishes these norms of what to attend to and what to ignore. With the delay of the TVEI by one year compared to England, the personnel had the advantage of viewing the first year's results there and putting a distinct Scottish interpretation on the aim of TVE. Policy statements like TVE allow for local interpretation as an aspect of the flexibility allowed. The statement of 'across the ability range' challenges the current system to provide students access to work with the acquisition of employable skills. The SCOTVEC certification of some low attaining students gives the impression of adherence to the original intent of the policy. In fact, the following excerpts suggest that:

> it is surface compliance and business as usual in the school...

and

> Certification became an institutionalisation of these students lower status... (TVEI interviewee, 1993)

Some personnel (Authorities' and TVEI interviews, 1992, 1993) complained of the advantage The TVEI gave some departments, and expressed resentment and disagreement as to what was accomplished with the funding and curriculum. The responses on the questionnaire reflect how external funding created inequities and disturbed the relationships between departments.

> Before extension ----- department staff received TVEI funding for staff to develop modules. Now with extension I have to take funding from all departments to provide technical and vocational education for my whole school (TVEI co-ordinator, 1993)

The TVEI was shaped by in-school polices and procedures. Some of the issues with which the respondents became involved follow. Adolescent behaviour and codes of behaviour are of utmost interest to teachers. Since students were to be prepared for the world of work and were representing the school on their work experience, this was an important issue.

> We had a student misbehave on that placement and lost the placement for others. (TVE interview, 1993)

The continued success of TVE is important. Teachers' involvement with

the curriculum framework, developed as a result of experience through the network.

The next question (Q 2.3) attempts to examine whether there is a continuum of practical training, vocational education and technical education. The relationship of these terms or their definitions to attainment is not referred at the foundation, general and credit levels (Q 2.31). This unclear differentiation between definitions allows for flexibility. In reality, there is no clear understanding in the questionnaire results as to the difference in school practice. For example, most TVE interviewees considered it inappropriate for a 'higher' student to be in a job requiring manual or unskilled labour. Manual labour, they stated, is appropriate for the low attaining students according to TVEI interviews (1993). The intents of the HMI (1989) in the policy documents may account for the teachers' understandings. Leaving the definitions obscure allows for some flexibility at the same time as not conceptualising them as separate.

Student placements on work experience (Q 2.4), in fact, are sometimes unsatisfactory. No differentiation is the school policy for length of placement (Q 2.41) for different levels of students. 'The local economy is to blame' (op cit.) for the shortage of quality placements. Interviews with the students after placement allows for wider employment issues to be discussed with them.

Resources are satisfactory according to 50 per cent of the respondents (Q 2.5) but unsatisfactory according to the remaining respondents. The response to the question about resources may be mixed because some schools had access to the project funding. Funding differences raised issues of equity that the HMI (1989) attempt to resolve in their Technology Policy with flat-rate funding. Fullan (1981) says resources present problems related to differing needs: giving the same amount does not ensure equity.

Five of the TVE personnel interviewed (1993) thought that their schools benefited from pilot funding but that additional resources are needed with the extension to keep the momentum of the pilots. This is particularly true of those that had equipment maintenance. The Local Authorities became responsible for ongoing costs, but they dispersed this cost throughout the departments of the schools. One TVE interviewee

(1993) spent considerable time illustrating the funding formula and how departments of the school became burdened with the extension.

The next question (Q 2.6) asks respondents to suggest what would improve schooling for low attaining students (Fullan, 1982). The respondents recommended a narrow syllabus with hands-on craft skills that is student centred, along with upgraded equipment with audit and performance indicators. In addition, co-operative teaching with business and industry, more practical approaches, smaller groups, more staff, more resources, learning support, more time and addressing student entitlements were also put forward. The removal of students who are not interested is also recommended but without a suggestion of how to meet their needs. The respondents suggest behaviour is a reflection of interest. If disruptive students are removed, the remaining students are encouraged.

Involvement in initiating improvements (Q 2.7) is an undertaking of 40 per cent of the Scottish teachers who worked through management. Places for their contribution are the TVE network, research and local TVE committees. Forty-seven per cent of respondents made forward suggestions (Q 2.71) and of these 38 per cent had seen their suggestions adopted. With consensus established through the network, reaching an agreement was useful for schools in dealing with issues to form professional positions, thereby increasing their sense of efficacy (ibid.).

4.9.4.3 Programmes

The next function (Q 3.1) of teachers consumed 52 per cent of their day indicating their level of involvement with curriculum (Fullan, 1982). Defining course content or the relevance of the curriculum for various students is with in curriculum policy determined by the national curriculum committee. Three of the interviewees generously provided their materials. In addition, two interviewees offered classroom visits so that their programme could be observed. Others offered tours of their departments. I also observed one debriefing of work experience and one industry's employee-training programme; the latter was an innovative simulation enjoyed by both staff and students. The flexibility in methodology, while meeting course outcomes, is unique and is supported by a local business that provided the active involvement of its staff in the learning activity.

Flexibility (Q 3.2), for example, having alternative routes for attainment is available in technology courses (63 per cent) or between courses (37 per cent). However, these alternatives are not offered in secondary schools for the low attaining student, judging by the number of modules available. According to Sarason (1990) this is a reflection of the diversity of implementation.

Student choice (Q 3.3) among alternative routes for attainment is available in 50 per cent of the respondents' schools. This indicates the extent of student participation (Fullan, 1982).

The time available for work experience (Q 3.4) is generally one week in 43 per cent of the schools, according to the respondents. Prais and Wagner (1985) are of the opinion that the length of work experience attached to the apprenticeship accounts for the German success with their low attaining students. Unfortunately, this remains untested in the Scottish example although it may be born out in the Further Education statistics for this stream.

All students have the opportunity to have work experience (Q 3.5). Only 8 per cent of schools offer it in S3, 80 per cent provide work experience in S4, 3 per cent in S5 and 2 per cent in S6. The remaining 7 per cent offer work experience in more than one grade. This question is a follow-up of the preceding question as the interest is in the attainments of students with varying levels of work experience. Owing to the response to the later questions on attainments, this remains unknown.

Work experience available (Q 3.6) is generally one week. No provision is available for an extension of work experience in 36 schools. The other side of the placement discussion can be illustrated by the highest scoring student in the credit group who had a manual-labour job placement and became interested in pursuing that career. Interviewees clarified that work experience is not a career placement, and that counselling is necessary to help the students with decisions about their future. While the previous question suggests some flexibility in policy interpretation, the responses here are mixed with no indication as to what allows some schools to make adjustments.

According to the respondents, the opportunity to have a permanent work

placement (Q 3.7) from secondary school is not a possibility in 88 per cent of the schools. The remaining schools allow this. It is not known whether this response includes school leavers who secure a job. Again, this question attempts to examine the flexibility of the policy as interpreted by the schools.

More than one work placement (Q 3.8) is available in 38 per cent of the schools, indicating the extensiveness of the exploration of the work place (Ashton at al., 1990). The respondents said that its practical nature is the more successful one for the foundation students. The one-week limit is insufficient for many of these students to obtain the skills. One interviewee said that longer on-the-job preparation and training would be beneficial for a number of other students as well, but the local community had high unemployment and the school could not find placements. Longer work experience occurs later and fits more with the Manpower Service Youth Training Scheme offered after secondary school. As for the the relevance of the current academic approach to technology, most schoolteachers said that more individualised programmes are workable. The following opinion is an example of the issues.

> What can I do? They don't came and when they do I try to get them caught up, but it's hopeless. They have to do the work. Some of them need more than I have time to give. After a while it becomes clear and they just stay away (Scotland, 1993)

This is an aspect of the large school leavings (SED, 1991) in this group at the time.

Teachers are not involved with the transition of those students who leave school at 16 for employment. They do not see a role for secondary school when students receive training in the workplace. Teachers see the role of Further Education Colleges as covering this experience for the age group. The implications for the system is that there are funding routes in Further Education, on-the-job training and Youth Training Schemes. Cost savings may occur with the variety of post-secondary funded organisations and structures for training that may be considered in secondary school (TVEI, 1993).

The answer to this question (3.9), which is related to the previous one, indicated all subject areas, with one exception, are able to provide work experience. The most frequent subject using work experience is technological applications (52 per cent); the least uptake is in

physical education (30 per cent). Interestingly enough, the exception is religious or moral education; TVE work placements does not include the charities work evident in communities. TVE interviewees did not clarify this anomaly. In part, the way in which this subject is taught may account for this result.

Programme adaptations (Q 3.10) or local innovations are available for students who do not progress. As cognitive development is uneven, as is the physical development of the adolescent, provision for this variation is useful. For assistance, respondents use learning-support first (50 per cent). Other respondents use guidance, parent notification, remediation, reduced course load, after-school study schemes, differentiated materials, technology, co-operative teaching programmes or special needs. The debate about being able to 'hurry' cognitive development through the curriculum, which is discussed in developmental studies (see Chapter 2), is not addressed.

The next series of questions (Q 3.11 to Q 3.12.6) sought to identify the outcome or attainment of students at the foundation level. Teachers generally did not answer these questions. In part, reports are that the then teacher job action in response to the impending publication of examination results interfered. Another explanation of the job action was as a response to the then new Standard Grade (1988). For those who did respond, the range is quite broad. The number in foundation level in schools was within the per cent defined by Dunning (1977). For example, The range reported in S4 is between 10 and 20 per cent.

As noted earlier, because of population skewing, the designations may be considered to have little meaning other than perhaps to identify those academic students who will be supported for higher education. The low expectation surrounding the concept of foundation may be self-fulfilling and may limit the outcomes for these students. Many students, as mentioned previously, are not encouraged to take examinations, thus reinforcing a lack of success in school. In addition, because taking written and memory-based examinations is not the method of choice for these students (Hunt 1971; Johnston, 1991), there is a systematic bias both in the provision of a practical programme and in the practical examination.

In the opinion of the respondents, TVE does not improve the attainment

of the foundation student (Q 3.13) and, therefore, does not meet the aim of providing for 'across the ability range'. Their suggestions are more appropriate curriculum, material relevance, vocationally based work experience, more practical subjects, more variety, fewer subjects, outside-school experience, lower pupil-teacher ratio, more support, learning support and parental or home support.

Regarding programme, the HMI (SED, 1989) observed that after the initial interest in TVEI, abler students avoided it and the initiative polarised the student population. There is a division among the social groups in the mixed-ability classrooms. According to Croxford et al. (1991) the TVEI has the effect of enhancing the schooling of the less able students by providing some few attainable modules.

The respondents (Q 3.14) did not express a single clear opinion on the relationship of schools to apprenticeships. Twenty-five per cent said that school should be co-ordinated with apprenticeships. These opinions reflect agreement with the SCOTVEC approach.

Only 8 per cent (Q 3.15) replied schooling is integrated with apprenticeship, raising questions about the understanding of the SCOTVEC.

The evaluation and attainments achieved by TVE are appropriate according to 47 per cent of the respondents (Q 3.16).

TVE could not deliver the hoped-for results in employability terms. The abler students with Ordinary or Standard Grade and 'higher' grade courses are still preferred by employers (Bell, 1988). At a time when unemployment is high, to hope that the foundation students would find opportunity is perhaps unrealistic. Most industrial societies have not come to terms with the underlying question of technology that replaces the work for large sectors of their societies, particularly the unskilled (Ashton et al., 1990). The social planning that is necessary is wider than the jurisdiction of TVE. Only one depute interviewed raised the issue of jobs for these students. Most of those interviewed do not consider student issues outside and beyond secondary school. They indicated that the task of finding placements is difficult and time-consuming. The potential that establishing community relationships for these students through work was not fully realised (TVEI interviewee,

1993).

The TVE, according to respondents, has not changed the employment opportunities of the lower attaining students. Various factors at the school level counteract the intention that attainment would improve. Some alternatives are not being consideration. The satisfaction expressed on the questionnaire with both attainment and evaluation reveals support for the status quo for the students in question.

4.9.4.4 Promotion

The Scottish Examination Board defines formal promotion practice. The broad terms for this practice was defined by the Dunning Report (1977). In the classroom teachers adopt informal practices that lead to the implementation of that policy in the TVE. This section of the questionnaire consisting of eleven questions, examines that implementation.

The preference (Q 4.1) is promotion by subject, which is a positive feature of comprehensive schools. Forty-two per cent of the respondents said that promotion to the next year level required a pass in all subjects. Other respondents (52 per cent) said that in their school modules enhance success and achieve partial success (35 per cent) by the use of fewer subjects. Again, the practice reveals a mixed approach, which may not be beneficial to students when the range of opportunities between schools is compared. With extension, the practice in promotions became institutionalised, or similar for similar students.

The next question (Q 4.2) examines the alternative promotion practices. Those students identified with special needs may have alternatives provided. These practices usually consist of accommodations around the amount of time on examinations or allowance for alternative submissions. Thirty per cent of schools also allow these practices for students who are functionally similar to special-needs students but without the designation. Therefore, most low attaining students do not have similar opportunities. Again, these practices raise the question of equity.

The foundation student, both before and after being identified through examination by the Scottish Examination Department, do not have the opportunities afforded other students. Even in mixed-ability classes, the education system sets a 'class' system in place that is based on

ability. This begins with grouping in primary, which is a very early stage in the minds of all children and without open discussion as to its implications.

The respondents defined the functional differences (Q 4.3) between special-needs and foundation students. Ability (52 per cent) appears to be the main functional difference in the view of the respondents. No difference is the response of 16 per cent, while 7 per cent thought that attitude is the difference and 2 per cent that attendance made a difference. Students with a need for more education support and direction as Hunt identified (1971) receive the least attention.

Interviewees do not have clear expectations for the attainment of these students, which leads to employability. They expressed difficulty with elaborating on ideas, such as lifelong learning, students' futures beyond schooling and possible expectations and support needs for work.

Multiple factors (Q 4.4) determine promotion according to 67 per cent of the respondents.

Given SCOTVEC and its certification, the training role of schools for possible jobs is one factor (Q 4.5) The student characteristics of effort, performance or attainment, motivation and attendance contribute to the teacher's recommendation for promotion. Even when students have not achieved the current year they move automatically into the next one. For most of the foundation students, this means ongoing placement in situations of failure.

Later, in the TVE modules for Personal and Social Development, teachers attempt to teach self-confidence, which led one to the following conclusion: 'This is a daunting task.' (TVEI interview, 1993)

In Scotland most tests (Q 4.6) are written in the class and require the student to demonstrate a good memory of the lessons. Croxford et al. (1991) observes that the higher attaining students take 'S' grade examinations, which occur at the end of term or near year-end. They require the student to remember the content of the subject for various lengths of time. The low attaining student is less able to do these written and memory-based examinations (Hunt, 1971; Johnston, 1991); other students may also take examinations at two levels and, thus,

benefit from the highest attainment. For students identified as having special-needs learning problems, recognition of their needs occurs within Standard Grade certification and may include the SCOTVEC modules.

The outcome for the foundation student is failure or, at best, a level of National Certification that does not prepare him or her to move into a work-related situation. While the structure of education attempted to reduce an essentially failure outcome, the main remaining option of learning-by-doing is still not examined in the secondary school. The resistance to an integrated apprenticeship, which has been successful in other locations may lie in the academic approach used.

In education debates, the responsibility of the school for sorting out students for further schooling or industry is long-standing (Raffe, 1984). Those interviewed said that when students are required to attend school and public funds expended, they support the development of non-academic skills at the appropriate level and in the appropriate manner. Both students and teachers experience less frustration, in their view, and increase student outcomes. Whether skills are taught through work or in school is a debate that advocates for these students.

Partial completion of work (Q 4.7) is recognised by 63 per cent of schools but not by 33 per cent. This is a further example of mixed practices leading to inequities. It is unclear what the implications are of this difference in practice.

(Q 4.8) Most teachers (83 per cent) use discretion when promoting students. Here, discretion means promotion to the next year level in a subject 'when ready' and then, within the ability group.

With respect to promotion without sitting an examination (Q 4.9), the responses divided equally at 50 per cent. In interviews, teachers said that a death in the family, illness or personal crisis are cases where staff may promote without examination. Other situations, such as examination anxiety or personal problems, like the break-up of friendships, did not receive consideration, although these events may be overwhelming for adolescents.

An important feature (Q 4.10) of the foundation student is a greater capability for practical work than for written work. The relative

amounts of practical work and written work varies widely among schools. One-third of the respondents report that the practice varies by subject. Written work is usually the basis of the national examination. This disadvantages the low attaining student further.

(Q 4.11) Those interviewed and those responding on the questionnaire made suggestions for improving the outcome for these students: more preparation time, more equipment, smaller classes, work-based courses, a coherent cross-department agreed course, increased interest in these students, appropriate instruction level, motivation and individual assistance. One example was to have the students do a practical demonstration of what they learned, such as illustrating welding techniques by making a metal object.

With the many recent changes in curriculum and other system-wide changes at the national level, teachers have little time or energy left for these marginalised students. Those interviewed (1993) said they had difficulty meeting the competing demands of the school. Some outlined the extent to which they could incorporate the change in policy into their subject area to meet the goal of TVE.

4.10 Conclusion

The MSC TVEI policy initiative had its roots in a work-related ideology as opposed to the academic one of the education system. The differentiating of students, which historically has favoured the academic students, changed modestly with funding. The designation of students as foundation introduced some flexibility, which, however, was effected by the assessment system. Even though the SED introduced a technology subject and allowed for students to attain the Certificate courses and SCOTVEC modules within the new vocational approach, the number of students who stay on at secondary school was affected either in the project phase (Paterson, unpublished and undated) or in extension (SED, 1991).

Evaluation at this stage may not reveal improvements for the low attaining students that may occur in the long term if employers come to accept the SCOTVEC certification or other employment strategies are adopted. A large change in student populations occurred in the Scottish project phases owing to replacement of students that withdrew from school, either as permitted or by nature of being truant (Bell

interview, 1991). The SED statistical reporting (1991) does examine the extent of non-attainment within the low attaining student group, who are now designated foundation students.

In this research, most respondents had a positive regard for those changes which they thought would assist the learning of all students without necessarily being directly linked to skills for work. Continual review of the attainment goals of secondary schools in relation to this student group may lead to improvements in their opportunity to receive a certification recognised by the community.

CHAPTER FIVE: ONTARIO: A CASE STUDY APPROACH TO POLICY AND IMPLEMENTATION EVALUATION

5.1. Introduction

Changes to Ontario's secondary school technology policy occurred in 1985. This case study sets out the changes made by four governments during the period 1984 to 1990 to the implementation of that policy. The structural features with their functions are described by implementation stages (Downey, 1988) and form a parallel to those found in Scotland's case study. This description is in preparation for the comparison, in Chapter 6, of the technology policies instituted in Scotland and Ontario.

The focus herein is on the low attaining students in Ontario selected into a level called Basic (see Appendix C). The argument of this chapter is that the provisions in Ontario that recognise the difference between the basic students and the rest of the student population become the way by which basic level students become marginalised in schools and beyond. Since Ontario's policy addresses the low attaining, or students at the basic level, as well as the general and advanced level students, implementation includes the full range of students. The Human Rights Code (Ontario, 1977) is the basis for full access of all students to publicly funded programmes in Ontario.

To draw the parallel to the network established in Scotland, this section examines the staff structures responsible for implementing the policy. At the secondary school level, the technology directors, through their implementation functions, define the relevant aspects of the policy.

5.1.1. Origin of Work Experience

Different applications of work experience in technology courses evolved from changes in practice. These course applications were devised to address, first, low-ability needs, and then needs from 'the world of work' (Appendix C). In Ontario, no studies on how to provide technical and vocational education to students of low attainment and low ability took place.

From the gradual incremental shifts beginning in 'practical' work experience, establishment of technology as a subject occurred with the 1977 legislation for the comprehensive secondary schools of the province. Some of these subjects are available to low-ability students. The system recognised these students as students at the basic level, as per the document, *ONTARIO SCHOOLS: INTERMEDIATE AND SENIOR (OS:IS,* 1977). The definition of students at the basic level overlaps at times with the special education (needs) legislation (Bill 82), both of which recognise the entitlement for all students to a secondary school programme. Therefore, education moved gradually to providing practical work-based courses in secondary school for low attaining and other students.

An additional use of work experience for students occurs during career weeks organised through the guidance offices and business study courses. Students spend varying amounts of time outside the school in workplaces following their career interests. The amount of time out of school is within the 110 hours (ibid.) that defines a course. Recent 'renaming' of some programmes with work experience as co-operative education has occurred. The government memorandum regarding this form of education has two components: first, the in-school component in any course with work experience, including technical, makes up a third of the course time; second, the time is now formalised as standard practice.

5.2 Ontario's Designation of Students

In Ontario designation of students occurs in somewhat of a similar fashion to Scotland's approach. Student identification as low attaining and low ability is the result of in-class informal evaluations and examinations. Designation may occur any time during schooling (as early as primary one); the student may enter school identified as a low attaining and low-ability student from a social service early

identification programme. As in Scotland, these students enter mixed-ability classrooms in elementary (primary) school that extends up to the eighth grade. These students are subject to grouping as low attaining for each subject.

Further, students may have mixed designations, as the designation basis is on their attainment by subject. For example, a student may have difficulty with science and be designated basic in that subject but have a general designation for algebra and an advanced designation for language.

5.2.1 The Students of Interest

In Ontario, recognition of the low attaining students comes about as follows. In elementary school, the students are informally identified by the classroom teachers who recommend at which level the students should enter secondary school. Identification of some or all of these students, depending on the local Board policy, may be formal through special-education identification for basic classes. Limited special-education resources determine not only the number of students formally recognised, but also the amount of classroom support. Resources vary between Boards, therefore, equal treatment of these students between Boards is an issue. The variation in practices also makes it difficult to identify this student population.

In Ontario secondary schools, low attaining students in separate classes for curriculum delivery is considered appropriate to their level of ability. Characterisation of the system is as being 'streamed' by ability based on elementary school attainments. An adapted variation of the curriculum guideline is taught these students. This practice is aside from the formalised special-education identification of students as having special or exceptional needs which takes place in most schools. A student can have both designations. If the students complete four years of secondary schooling the award is a secondary school graduation diploma that indicates the level of attainments.

The streaming of students into basic level formally in secondary schools allows the accommodation of low attaining students in segregated basic classes (see Appendix C) with students of similar attainment. The Ontario education system maintains that enhancement of attainment occurs with 'streaming', or 'tracking', because the curriculum is adapted to

the level of ability and attainment.

5.3 How Many Students Are There?

Basic students constitute 7 per cent of all students registered for publicly funded schooling (MET Quick Facts, 1991). Yet, the actual number of basic level students is greater since students in Ontario may take courses at a higher level. The students have 'a right to fail' (MET Staff Interview, 1991). Ontario keeps data on enrolments only. There is no data maintained on the students who switch streams; however, school interviewees (1991) maintain that eventually the school path of these students is to be an early leaver or a 'dropout' due to school failure.

As mentioned, basic classes present curriculum at the level of attainment for these students. The dropout rate for basic level students is at about 53 percent (Fullan, 1992). The dropout rate reflects the degree of relevance of schooling with students often leaving secondary school without the necessary skills to be self-sufficient in terms of employability. The Ontario research cited in Chapter 2 defines the level of support needed to help these students to remain in school.

5.4. Introducing Change: Stages in the Policy Development

To capture the policy events, one must consider the timeline of the changes in technical education through four changes of governments. The effects of the new structures and their functions have various consequences in Ontario schools as the policy implementation develops.

5.4.1 Initiation

The Ontario education system had to attend to several special interest groups (Downey, 1988). Externally, industry employers were critical of the skill level of students so the government directed local Boards that teachers were to assist developing the new technology programmes in schools (MET, 1991). Employers indicated that a higher technological skill level was required of youth for the labour market.

The Ministry of Skills Development (1991) reported that the hiring patterns of the labour market had a main growth area in computer technologies. Other interest groups that focused on the unemployed and the homeless youth were not part of the policy input. They had an interest in the interpretation of the policy initiative. The main group that appears in the documents (1985) consisted of the prospective employers, who were largely the supporters of the Conservative government. The Ministry of Education and Training (MET) attended to

their interests through implementation. The MET was given the lead by the government, within the provision to extend skills to all, a pluralistic or diverse mandate based in the Human Rights Code (Ontario, 1977), which determines part of the legal requirements for government policy.

During the elections, little public debate focused on the issue of youth unemployment or education. Ontario had a history of provincial governments considered as 'caretaker' governments (MET, 1991) which served as the administrators of public programmes. But, the 1980s economic downturn, which began the concerns about youth unemployment, was responsible for policy shifts. The economic changes resulted in less discretionary special funding within education.

For the policy implementation, the MET established a committee structure for technological education in the curriculum branch of the MET, as it would for each area of instruction in the programme process. This process was normally to be part of a system-wide five-year review process (CRDI: Curriculum Review, Development and Implementation) for all curricula subjects. Two groups participated: Ministry personnel and the technological consultants of Boards with some technology directors of schools in small Boards. The availability of personnel depended on the size of the Board and its staffing decisions. Therefore, the following personnel worked on the updating of technical education: government bureaucrats, education professionals, consultants, and technological directors, either at the Board or the school level.

The ideology of the MET bureaucrats is their belief in their administration and management of the education system (Lawson, cited Ball, 1990) in the UK and verified in the MET interviews (1991). On the one hand the MET valued cost-effectiveness and centralised control through the curriculum and, later, through provincial examinations. The Ontario bureaucrats implemented the directions established by the Conservatives in the 1980s, through the short Liberal term in office to the New Democratic Party (NDP) term, and finally to the next Conservative government of the 1990s. The bureaucrats though considered themselves to be impartial to the political agendas (MET, 1991) during this time, but there were the beginnings of partisanship developing in the early nineties in the civil service.

On the other hand, the educational professionals, educational consultants and technological directors of the Boards supported professional subject alliances, experience and practice (technical staff interviews, 1993, 1992). Some of these professionals participated by invitation on the writing committee for the official technology document. Their colleagues considered them aligned with the government of the day (ibid.). Unfortunately, the classroom teachers who were trade-based were not on side with the government or the senior professionals in these changes. Their attitude to the changes had classroom implications.

The basis of the curriculum organisation was in the contacts with the curriculum branch of the MET. A co-ordinator and three assistants would be responsible for specific areas. One of these areas was the management of any legislative requirements. These personnel ensured that there was co-ordination with outside interest groups, such as the teacher federations who have an interest in any change affecting their members. These groups were concerned with this initiative because it was not solely an upgrade of curriculum content but a reorganisation of the delivery of technology curriculum. The Faculties of Education at universities also participated because of changes in teacher training, in-service training and professional development.

Eighty-nine personnel, mainly from Boards of Education, were involved in the writing and renewing of the technology curriculum into seven areas. Some of those on the seven subject committees were also relating to the minority French-language group both within the MET and in the local Board structures. This group met separately outside of the larger structure, but had liaison membership to any structure that the MET established.

The seven committees with their co-ordinators had responsibilities to develop the curriculum guidelines in each of the seven substantive areas: communications, construction, manufacturing, personal services, hospitality services, technological design and transportation. The curriculum, in addition to amalgamating the wide range of courses offered in each area, put in place one of the first completely generic approaches to a curriculum area. The committees established a school model for revising courses, called STEPS to carry forward the change in approach. This model included: a student and community needs assessment;

a statement of purpose for the course; a course of study outline; an outline of the instructional units and lesson plans; a delivery of instruction, which included co-ordination with practical applications; and a two-level evaluation process, one for students and one for the programme.

With the rapid change of political parties in government throughout the 1980s, the policy process suffered disruption. The original CRDI process had provided for input from the many levels in the technology sector, from the schoolteachers to community interests. This input constituted programme evaluation and directed changes to the subject guidelines; this was co-ordinated at the level of the central government within the MET. The evaluation was to include enrolments and issues of programme implementation within the curriculum guidelines, but did not include student attainment. The student attainment statistics are the property of the schools; MET does not maintain these centrally.

According to Downey (1988), personnel utilise information to varying degrees. Interviewees (1991, 1992, 1993) indicated neither an appreciation of the stages of policy development nor analytic methods, as they had no special preparation for policy implementation. Furthermore, the government promoted some MET personnel who were sympathetic to them according to the interviewees. The advancing of personnel within the civil service and hiring of contract staff with the promotion of some programmes were outside the usual organisation lines. In addition, other programmes were shifted out of the MET for special bodies to run. This destabilised the MET's personnel (MET interview, 1991). At the same time, there were government-wide budgetary issues, which resulted in 'freezing' of personnel across MET and all the government. The confusion of strategies and ways of approaching issues came to mean that the programmes became identified with the particular government that funded them. The former impartiality in the civil service become politicised and the determining factor in policy was summed up by a senior civil servant in this way:

> If there isn't funding attached then they don't really support it or mean it (MET, 1991).

The mixture of ideological positions raises the following question: How can the new approach represent what is in the best interest of all the students, especially those who are academically disadvantaged? There was no organisational responsibility centred in the MET, or elsewhere, with

the specific mandate to evaluate attainments within the three streams of students.

The neglect of scanning the education environment (Downey, 1988) had serious implications for implementation, in that little available information on technology education for various student groups was available or used. The central Conservative government simply interpreted that rising youth unemployment indicated that secondary schools were not preparing students adequately. The documents available on the initiative did not include studies illustrating how youth employment needs are a function of preferred education approaches. Again, this lack of information was characteristic of the next stage; that is, creation or crafting alternatives achieved through scanning the imagination (ibid.).

5.4.2 Creation

As indicated by the interviewees (1991, 1992) and in the documents, the interest was primarily on introducing high-end computer studies across the secondary schools. Addressing the needs of all students was challenged by special interest bodies as inadequate as was the new approach according to the teachers interviewed. Schools, targeted by the Conservatives as responsible for youth unemployment, did not assume responsibility for unemployment nor should they according to those who recognised the problems of the changing economy.

In Ontario, the development of the curriculum documents gives the appearance of an organising approach. The direction of the curriculum had the support of the senior educational hierarchy, and became the product, or output, of the MET.

The more valid emphasis would be on student effectiveness criteria, since the production of curriculum documents is to provide for their successful attainment, all other things being equal. The initial stage in the development and implementation of the curriculum was the assignment of some technology directors as the experts in one of the curriculum areas (Downey, 1988). The MET decision to write curriculum using some MET staff and Board co-ordinators was prior to establishing funding for implementation. At this stage, the MET paid the Boards for their personnel's expenses. This funding ensured that the designated personnel were on side with the 'Broad Based Technology' approach when

promoting the documents.

This thesis questions the relevance of the technical education that the substantive experts defined and provided, and is the core of the policy evaluation.

Downey (1988) suggested that advocacy, compromise and competing alternatives are the realities of the education analyst. The government-appointed committee members provided expertise in terms of knowledge of the students and learning activities. While most of the committee members were Board personnel who made recommendations, the MET staff made the final choice. When the Boards were unsuccessful in their suggestions, the committee members found themselves in uncomfortable positions, both on the committee and in their Boards.

The government of the day 'signed off' in terms of the approval of the approach and a budget to print the documents and deliver them to the Boards. With the frequent changes of government, this provided the senior MET staff with the opportunity to take advantage of the uncertainty of each new government (MET interview, 1991).

In this technical initiative, the subject experts both in MET and in the Boards were used to promote the changes that usually are the domain of the policy-process expert (Downey, 1988). Effectively, these two staffs integrated in a quasi-working relationship within the committee to develop and implement the new curriculum policy. None of those interviewed (MET, 1991) questioned the committee's formulation of the policy emphasising development on behalf of the advanced student, thereby neglecting their professional obligation to advocate on behalf of all students.

The policy-issue knowledge contained in curriculum guidelines cannot be claimed as scientific or necessarily rational (op. cit.). The original political interest was to promote skills designed to enhance the employability of youth. No industry involvement occurred at this stage of the policy development, although it had defined its expectations of employability skills. The skills are as follows: communication; thinking; teamwork; personal management skills demonstrating positive attitudes and behaviours; responsibility; adaptability; and lifelong learning (Conference Board of Canada, undated). The expectation was that

schools would promote these skills with students.

To continue on the input side of the equation, through the initial invitation to assist developing new curriculum, the Board personnel both contributed to and learned the new approach to technology education. This constituted the training of the Boards' co-ordinators and they, in turn, trained the rest of their teachers using the new approaches. The Boards who originally participated and set up new classrooms on their own felt that they had been short-changed, for they had funded the change themselves and received no central government money (Board interviewees, 1992). This increased dissatisfaction with the changes and the MET.

Curriculum with a high level of technology equipment was in use in some of these schools across the system, as mentioned above, so this gave a wider audience to the approach. As for work experience, the initiative served to encourage the variety of approaches used for student field visits and now supported advanced students working with industry specialists. The shift of emphasis on work experience for advanced students was a benefit to them.

5.4.3 Analysis

As to stage three, analysis or estimating the consequences of a proposed policy by tests for robustness, the five criteria suggested by Downey (1988) are: fidelity to legislation; the economic feasibility of goals and mega-policies; political viability; spill-over risks; and moral or social acceptability. Again, the MET's failure to examine information of the type suggested by the criteria had subsequent implications.

The official policy documents (1985) described a prescriptive direction to Boards which the interviewees confirmed (1991). The failure to estimate consequences of the changes had later implications. The applications asked for an outline of the intended direction for the new curriculum of the Boards' teachers with a plan presumed developed in conjunction with the MET committee member. Negotiations for approval was between the committee and the Boards' project officials who established the environment for accepting or limiting innovation and creativity in their new curriculum. Schoolteachers (interviews, 1993) claimed the lack of subject expertise in the MET and their approval limited their options.

In the testing of alternatives for robustness in curriculum, Downey (1988) argues that generation of new alternatives requires intuitive, non-scientific approaches. In Ontario, there were no pre-tests for effectiveness of programmes before the announcement of the curriculum policy or after extension to all schools. No pre-tests or challenges to the approach occurred until later information revealed that some teachers were not implementing the curriculum. Some schoolteachers were the ones generating creative alternatives by adapting the curriculum to their circumstances (MET, 1992).

Legislation was not required for either the MET or the Boards, thereby avoiding public debate. Later legislation was required for changes to course codes and teacher qualifications. Distancing these changes from the curriculum initiative was a strategy requiring the programme at the school level to change first. Later, teachers required the new qualifications. Those currently teaching the new courses would be 'grandfathered' into their position, but not allowed to change schools unless they acquired the new qualifications.

As the direction of the initiative came from the MET's technology department together with the Board personnel and finally to technology schoolteachers for curriculum development, they all played a part in conceptualising the curriculum approach. Only some of these educators had loyalties to the Minister and the government policy. Some senior personnel of the MET attached to the central office had more ties to the government's agenda and controlled the initiative from that perspective (MET, 1991). Others did not have an interest in the agenda of the government and in less than obvious ways undermined it at the committee level with delays and non-attendance (MET, 1991). The MET personnel in Ontario had ties in many directions at the Board level and within secondary schools through professional organisations. This informal contact system established by personnel at various levels provided the development of the new curriculum with those school departments who were already providing leading-edge curriculum. A divided loyalty of the senior educators at the Board and school level developed over the curriculum direction (Staff interviews, 1993).

No debate occurred over the range of strategies possible to deal with the employment issue as it relates to youth (ibid.). This is

particularly critical for the lower-attaining students without skills to offer for employment. The government had targeted schools in their attempt to increase skills and qualifications, and in this way to deal with youth employment. The wider public debate around the economy and its performance, as well as, the needs of those without skills and the MET's possible supportive role was not debated. The MET (1991) needed parents to debate the provisions of schooling for all types of students however this was not part of the government's agenda. There was no debate about the social choices regarding the Ontario economy, which cannot provide work for large sectors of society; there was no debate about these issues related to the provision of publicly funded schooling for all. Due to the way secondary school is structured to provide a streamed programme for the low-ability and low attaining student, a moratorium occurred around these students as to what they could attain in certification of skills for work (MET, 1991).

The teachers concluded that the MET personnel were engineering the technology curriculum towards an academic rather than trade-based direction (interviews, 1993). The intent of the MET (1991) was to raise the profile of the subject overall into the high-tech end of the curriculum. Since the central government directed little funding to the initiative at this stage, no cost-benefit study occurred. Because the financial approach involved a local share of taxes to pay for equipment when the Board curriculum was approved, the initiative created some political issues for poorer Boards. The benefit of upgrading courses was limited, according to some Board educators (interviews, 1992), as the computer skills defined for the advanced students already were open-ended.

Political viability was not at issue because the government of the day determined the policy. Management of the change was in terms of trying to improve youth employability, which the government determined was a supportable cause. This education policy posed no risk to the rapid succession of governments through this period. The governments of the day were managing the information through their own internal surveys to determine election issues.

Although curriculum implementation occurred within the normal structures, some teachers delayed implementation. Because of their concern for some students and for themselves, with the move away from

the trade base, some schoolteachers (interviews, 1993) questioned the approach. They questioned the MET's changes to the initiative during the terms of three governments. These educators thought that the MET took advantage of the governments' lack of familiarity with the issues (ibid.). According to six of the schoolteachers, the advice given by the MET to the Ministers was flawed and negligent by not advocating on behalf of all students or those less capable.

> The MET staff didn't know each programme available so I had to phone to _____ board where they developed this curricula. It wasn't following MET guidelines so I had to make changes as I went along. The students here weren't interested in this [guideline activity] so I was also giving them some of the activities from the old guideline. Enrolment really dropped off as the word got around to the students that we weren't giving the _____ [previous] curricula (Interview, 1993).

Therefore, the acceptability of the policy formed by the MET was questioned by some classroom teachers. The approach left some teachers outside the policy implementation and contrasted with the usual co-operative goal-setting tradition of the education system. The political environment explains how the successful teachers incorporated the external pressure to benefit the advanced students. The interest in the advanced students may be considered a system bias stemming from the tradition of providing more years of schooling as a benefit to higher attaining students, certification recognised for further schooling or work and at times financial support. Therefore, the MET redistributed what had been a universal provision.

5.4.4 Choice: The New Policy

The MET response to the Conservative initiative was to establish new policy. The curriculum policy guideline, *TECHNOLOGICAL STUDIES PART A*, developed by the curriculum committee, was introduced in 1985 as an outcome of the committee's meetings.

The policy indicates change in direction in the following way:

> CHANGING EMPHASIS OF TECHNOLOGICAL STUDIES (MET, 1985)
> Technological studies have traditionally met the following needs: the provision of introductory skills and knowledge for the trades; preparation for post-secondary education and training; the development of personal and employment-related skills; the development of technical literacy; the heightening of aesthetic appreciation; and the development of problem-solving skills. All of these needs are currently being met to varying degrees by programs offered in industrial arts, occupational/vocational, and technical courses. Although these needs will not change dramatically in the near future, the emphasis or focus of many

courses must change to suit changing technologies.

> Business and industry has been making increasing use of computers, robotics, lasers, synthetic materials, and micro-electronics. Training in specialized skills and subjects is still an appropriate objective, but students also need to become much more aware of the interrelationships among the various disciplines of technological studies and to acquire a good understanding of applied mathematics and science. It is thus particularly important that advanced-level courses focus on changing technologies because in these courses students receive basic preparation for university or other post-secondary studies.

This was the first indication in a printed policy document to schools that one group of students was to receive more attention and therefore benefit more from the policy. The MET mandate is to advocate the interests of all students (Appendix C), not only those who were academically oriented. The argument here is that the interests of the academic student be provided for in the initiative, but also that the initiative should equally benefit the rest of the student population. The MET personnel interviewed (1991) did not know if succeeding governments knew of or supported the bias.

The restructuring of the technology curriculum was in part to demonstrate the interrelationship of subjects such as science and mathematics, and resulted in organisational change. The change consolidated a large number of course offerings in technology to the seven courses called 'Broad Based'. This meant, for example, that in the area called transportation all courses, auto mechanics, small engines, all modes of transportation, all studies of air, land and water transportation were to be combined.

The new documents reflect the 'changing skill requirements of business and industry' (MET, 1985). Three documents direct the changes within the subjects renewed with technological studies. *PART A* outlines the programme planning policy; *PART B* provides the subject guidelines from grades 7 to 12; and *PART C* outlines the content of the three Ontario Academic Courses that would be university entrance courses. For preparation of students, incorporation of elementary school technical education was into the science guideline as applied science. PART B of the TECHNOLOGICAL STUDIES document provides for the articulation of programmes between all grade levels from 7 to 12. The document provides for the early orientation of students into technical problem solving and dealing with practical problems. Elementary school is the introductory

stage for the meta-cognitive skills that are to be learned at the secondary level as well.

The technology curriculum guidelines PART B, (similar to SCCC's materials) are general content frameworks and directions to local Boards on the seven subjects. The current reorganisation is not the result of evaluation or specific recommendations, but part of the deliberations of the central MET committee. Not all of these documents went to printing or distribution because of changes in government.

Throughout the previous stages, some teacher interest groups raised objections. The design teachers especially objected to losing their distinct teaching area with the disbursement of design through the seven subject areas. The guideline (Part A) had changed from first five, then seven, generic technology areas of study: communications, construction, manufacturing, personal services, hospitality services, technological design, and transportation. This document is a more 'academic' approach to technical and vocational education in keeping with the intent of preparing students for university or other studies. Considered a move from the trade-based courses like auto mechanics, the document ultimately collapses more than 60 courses into the seven areas. Consequently, there is limited student choice. On the production of the documents, the curriculum committees disbanded leaving a central committee in the MET for the implementation to Boards.

5.4.5 Installation

The evolution of PART B of the document spread over more than six years, as there was a planned release for each of the seven subjects. However, only partial delivery of these documents occurred because the government changed and there was opposition to a few of the subject documents. Regardless, the MET installed the initiative by extending to all schools the new curriculum in 1995. However, there was no funding at this time. At this time the release of the document was through the MET's Regional offices personnel meeting with Board officials, going through the document changes, and answering questions. Then it became the responsibility of Board consultants to develop their approach to the curriculum for each of their secondary schools.

The release of finalised documents indicated that both the creation and choice of curriculum was decided in the committees using subject

specialists. Installation occurred with the release of the new curriculum documents, as their publication made them official. Neither the kind of analysis suggested by Downey (1988), nor the pre-testing of the curriculum took place before release. The choice stage was omitted because the documents supported those interested in limiting course offerings through amalgamation of technology subjects (Appendix B).

The emphasis of the policy was on advanced students with qualifications who can solve practical problems using work experience with industry. Industry was aware of the interrelationship especially of applied mathematics and science. This subject integration prepared students for university or post-secondary studies. The Conservatives, who were governing at the time, supported these statements, but the subsequent government did not act to support installation. The documents did not illustrate what schools were to achieve nor how the Boards and the MET would know when the aims were achieved. 'Outputs', or targets, for certification were not set for students. Employment schemes for youth were not developed. Only rather vague statements provided schools with direction. The committee members knew the reference points in the curriculum guidelines, which they believed, developed the new skills (1991). The public could not easily find the reference points nor identify the signalling of the move from the trades-based courses.

The MET formulation of the initiative of a Conservative government anticipated change to the underlying structures of schools to provide for all students, including the non-academic student (MET, 1991). In reality, only those students who elected technology as an optional course and sought to know the high end of technology would benefit from the new curriculum In relation to the curriculum changes, schoolteachers (1993) believed that low attaining students lost ground with the de-emphasis on the skills for trades. A refection of this deficiency in subject choices, made by a school co-ordinator, is in the following statement (1993):

> We lost our enrolment for new students this year and had to let go one staff as the students did not elect the new course....the students want to take the old
> auto course.

In Ontario, the Ministry of Skills Development is responsible for registering qualifications for apprenticeships. Advanced or general students are able to accumulate apprenticeship hours for up to one year

in secondary school. The few technical and vocational units (modules) that may begin in high school constitute the Linkage Programme. The new documents offered no indication about how to accommodate these courses in the new courses.

Furthermore, unresolved issues remain. The entry requirements vary for trades. Some begin after two years in secondary school. Welding is one such popular course, but the demand for it was decreasing due to robotics. Others, such as auto mechanics, require four years of secondary schooling as an entry requirement. In Ontario, a student can accumulate hours in secondary school towards the first year of an apprenticeship in fewer than ten trades. The accreditation of these activities occurs both through the school, in the attainment of an Ontario Secondary School Diploma, and through the select trade bodies that may provide dual accreditation of those apprenticeship hours accumulated in the school shop classes. This restriction to a few trades applied because the extension of this apprenticeship initiative in the early 1980s was not wholly successful. Part of the objection to this mixed model was from the adult tradesmen.

Placements in trades are very limited. The trades and adult market were not totally receptive to the school-based policy, particularly because of high unemployment. In spite of this opposition, some teachers still believe that development of apprenticeships in unregulated trades (specific to employers) as part of the restructuring of the curriculum offers students work experience and the skills implied in the policy. Specially designed unregulated trades offer possible employment, for example, maintenance staff.

In addition, the pressures of employability influenced the decisions of some of the advanced students not to proceed to university. They were entering, with advanced qualifications, certain community college courses that are more job-specific. An example of this occurred with technician training, which requires technology secondary subjects. These secondary courses and college courses may or may not be co-ordinated with university courses. The employment situation then dislocates the targeted general population for the community college facilities, the non-academic student. These students enter the level of the job training, such as, transport (lorry) driver or nurses' aid. Job training originally designed for the low attaining student is less available.

This trend transfers back through the secondary system. Students are often discouraged either by guidance counsellors or elsewhere from pursuing career and educational goals. As one teacher reported:

> We tell students about the local job market and trends generally for computer based jobs. Most of our advanced class is going to _____ college. They came here and made a presentation. Some of the advanced students could take an evening course through distance education and get a head start. It's too bad more of these opportunities aren't available. We're holding them back.

In 1991, the government established the Ontario Adjustment and Training Board, a business, labour and education special purpose body. One of the functions of this body is the transition between school and work, and the resolution of some of the above issues. Transfer of funding and programmes was to this special purpose body. Open meetings took place where there could be presentations from any interested party. Some of the structural changes suggested, however, remained unimplemented because the far-right Conservative government returned to power at this point.

5.4.5.1 Incentive Funding for Installation

Four years after the Ontario documents release, the MET developed a funding initiative to encourage implementation of the new documents. After the documents release, there was a hiatus in the overall MET functioning during the Liberal's three-year term in office. The funding addressed the concerns of those Boards who needed upgrading of the shop classrooms to implement the curriculum approach emphasised in 1985.

In 1989, funding support for the curriculum was available to the Boards who chose to apply to the government, which was now the NDP. The application process introduced competition for funding to upgrade school technology equipment to implement the curriculum. The NDP, a Labour Government, may have interpreted the initiative in trade terms, perhaps without realising how the new curriculum had negatively affected the trade aspect of technology departments. Alternatives in the curriculum were limited within technology subjects; other subject areas were accepted only if they were integrated in part of the technology projects. Again, the basis of the entire approach was not in current knowledge regarding the provision of successful technical and vocational education relevant to a range of students.

The $60 million funding initiative entitled TEPERF, (Technological Education Program Equipment Renewal Fund), focused on equipment upgrades in technology classes, and began in 1989 and ran for five years. Since the basis of these classes was in the trades, the requisitions that received supported were mainly those with computerised shop equipment. The initiative's funding came from the MET budget (DES and SED equivalent). But, the reorganisation through the curriculum follows a pattern in part recognised by Fullan (1991). He observes:

> Curriculum guidelines are not...the actual curriculum materials to be used. (p. 274)
>
> For most teachers the 'curriculum in use' is derived from one or more of the following sources: textbooks from commercial publishers, materials developed by their local districts, materials borrowed or adapted from other districts that have developed curriculum, or piece-meal planning...(p. 275)

The increase in the use of computers could be part of an enhancement across the curriculum since the MET encouraged technology to integrate with other subject areas. With the new curriculum subject documents, control through the transition was within the same overall secondary school subject structure. Further, reorganisation in the curriculum to include computer studies was facilitated throughout using the entire subject structure.

Within the application for TEPERF, there was also a renewed requirement for Boards to develop links with the business community through Industrial Councils or other meetings. This linkage was to facilitate the work placements in the community, to provide for advice on equipment, and to raise the profile of education in the business community. Activities such as job shadowing developed through this body. This was the way the Labour party, now in office, gave the message that it was ready to work with industry. This change was an additional complicating factor for the educators and, in fact, some of them resisted this direction.

No focus on the students' response to the curriculum or on outcomes was evident over the period of the renewal of technological education. The strategy was to apply for equipment funds to support the area of interest unique to each secondary school technology subject(s). Not all seven areas would be available in each secondary school. Availability depended on the qualifications of the teachers in each technology

department and on the students' enrolment (interviews, 1992).

During the NDP's term in office, the equipment funding supposedly encouraged implementation of the curriculum. A new role demanded of the MET during this time involved outside consultation. The management values had shifted to include more outside exchanges with a variety of communities and parent groups, and the MET required documentation of this in the Boards' applications for funding. This shift meant that the MET was no longer defining and controlling the information received by the government. The MET was no longer the only experts offering positions for decisions. The polling done by political parties largely determined the internal events. It is unclear whether funding schools in this way had wide support in the MET. The individual who headed up the curriculum committee at this time retired, and the remaining internal MET committee members distributed the remaining funding for the final two years of this initiative. Nevertheless, by approving the contracts and funds, the MET was in turn controlling the curriculum direction.

After the government determined its strategy, the senior civil service in the MET needed to give approval to Board and school plans. These personnel acted on behalf of the government of the day and did not share their decision-making role with Boards. The trustees of the Boards accessed the funds on behalf of the local taxpayer. The application for equipment became the means to access the funds. A school could apply in each of the five years. A limited number of schools received the full amount of $200,000 in the first year. Most funding spread over several years. With extension and no additional funding, all school technology funds then came out of the local share of education taxes and became open to controversy.

The appearance of successful implementation rested with the approval of funded applications. This cost (Gregg, 1976) does not reflect costs of staffing efforts at any level to install the changes. Where there had been provincial money, now additional local taxes were required. For unsuccessful schools, the local taxes paid all the expenses, which included not only equipment but also the renovations in schools and the teacher in-service training.

On the surface, all looks well until one asks accountability questions: What are the attainments and how are they measured? Are the enrolments

and the subsequent attainments increased in all groups of the student population? These questions remained unasked.

To justify new equipment, the funding created the input incentive to develop new curriculum in the successful schools. The curriculum become part of the output of the schools. Delegation of various activities followed the funding along the education organisation. The late introduction of funding allowed the NDP to encroach on the territory of other levels of the system, the territory of the Boards of Education in curriculum implementation and in teaching practice (school interviews, 1993) without system disruption. This opinion is disputed, though, as some technical teachers (Questionnaire, 1993) thought, the initiative was ill-founded, poorly conceived, and combined too many changes at the same time with the expectation of quickly improved certification results.

The schools resisted the implementation to the point that, in 1995, MET had to prevent Boards of Education from using the old course codes by refusing to give official recognition to these courses. Over 100 secondary schools had not applied for funding (MET, 1991). This strategy penalised students because the only courses recognised were the new ones (MET, 1995). Subsequently, the schools simply renamed their courses, using the new codes without changing their approaches.

The Boards and trustees welcomed extra funding to specific departments. While application process in effect installed the curriculum changes, a second function of the approval process meant that the responsibility for implementation shifted to the Boards. Each school developed its own approach. Meeting the criteria occurred almost automatically and without debate because teachers were forming their individual responses, perhaps without realising the implications of making the policy fit to their circumstances. Concerning the level of participation Downey (1988) cautions citing a chairperson:

> we assume the more widespread the participation
> the higher the level of commitment there would be... (p. 100)

In response to the criticism, the MET (1991) strove to illustrate that effective curriculum in the new technologies was in place using the high-end technology equipment as evidence to demonstrate this effectiveness. In Ontario, the MET wanted to maintain stability (Gregg, 1976) within the current education system. The funding allowed all

parties to realise some of their interests because of its connection to the new curricula documents. Yet, the policy was evidently deficient for parts of the student body.

In exchange for equipment, education provided a strategy to address the adoption of the curriculum by some schools, thereby satisfying the variety of political agendas since the application contract, the strategy of the Conservatives' market ideology became the inheritance of the NDP. Whereas, the attitude in the MET was:

> we can't reach everyone so work with those that lead the way...(MET, 1991).

In fact, this strategy used by the NDP increased their interest in working with industry through schools and their curriculum, then the funding timeline extended into the following term of the Conservatives (1995). Funding was the final encouragement to schools to update before it became mandatory to use the curriculum because when the curriculum became mandatory, the funding ceased.

Bargaining and incrementalism were became part of the method of revising curriculum for funds. The MET personnel bargained with the Ministers and their staffs during briefings to define the strategy. Normally the Ministers' briefing also included how the government day-to-day operations were to proceed and as part of this process, budget and staff allocations were made to each MET function. Following this, the negotiations with the Boards could begin. Funding then is critical as a method of controlling change throughout the system.

Both the MET and the Boards were of the opinion that the government only funded those areas it wished developed while other areas that had funding needs did without (MET, 1991; technology schoolteacher interviews, 1993). Those who experienced supply shortages especially noted this attitude. For Ontario, supposedly the government had its interests accepted for as Fullan (1984) notes funding is an important factor in the implementation of change, but citing Yin (1977)

> The larger the internal resource support, the less likely the effort will be continued after external funds terminate... (p. 89)

With the introduction of the new curriculum policy by one government, followed by a period of inaction by the MET, the aforementioned five-year funding period for equipment took place. Then, with the move to extension and no funding, schools that tried to provide programmes did

not receive coherent messages about the direction of the curriculum. Questions regarding the programmes for the non-advanced students went unanswered by the MET. The MET personnel did not have the authority to give answers because the legislation regarding the old 60-plus courses was still in effect (MET, 1991). These factors, together with the variety of governments through the time of the initiative, illustrate why attainment for the full range of students remained a non-issue. The inability of the MET to provide a smooth transition during this period indicates that conceptualisation of the policy and its installation was imperfect.

Disapproval of applications happened when the MET personnel recognised that the 'Broad Based Technology' direction was not in place because of their discussions with schools, site visits or incomplete applications. Bargaining continued in the projects between the MET and school personnel over the five years through the reviewing of applications. The applications had become the incremental approach to extension, the requirement that schools use the new courses. All the events, from the curriculum development committees to the announcement of the funding initiative with its projects to extension through course codes and with qualifications were incremental because they had not been planned at the outset. However, it was through this contractual process that control of these incremental changes occurred in Ontario.

To offset the authoritarianism of the central MET decision, the Board personnel charged with implementing the new technology policy needed a sense of commitment and ownership. The implementation strategy needed not only co-ordination and control, but also methods to support the efforts of classroom teachers. The structure of the computer electronic curriculum network funded by the MET provided this. The exchange of information and experience altered the substructure, as predicted by Gregg (1976), of technology teachers in schools. As they formed and delivered 'Broad Based Technology' on behalf of the MET, some Board personnel came to have more expertise than the MET because of working with students.

The electronic network meant sharing of decisions came across this network, as were the problems with the initiative. Because electronic connections were in place at all levels of the Boards and the MET, if the MET decisions were not consistent across the province, classroom

teachers now had a way of discovering this. For interpretation of government policy, this meant that more consistency became possible. For the MET personnel, it meant that there was more consultation within the committee structure to provide this consistency (MET, 1991). There was a wide resource to tap when seeking solutions. The MET staff recognised the usefulness of this electronic organisation tool, particularly for deflecting any criticism.

The electronic-network approach included in implementation satisfied the needs of the participants by establishing this new communication method for providing input. It further reduced the hierarchical nature of the professional structure, and with the exchanges between levels of the organisation, it meant that some flattening of the organisation appeared in the initial stages when problem solving was a priority. The Boards' teachers had increased access to the MET and could monitor their decisions and inform the trustees of issues. The trustees in turn could inform the political system of the different views between the Board personnel and those of the MET. This informed the governing body by opening up the education system to wider scrutiny. Government was better able to exert control over the MET's decisions with this use of technology in staff management (MET, 1991).

5.4.5.2 Forcing Installation

Finally, installing the technology curriculum in Ontario meant that the MET had to force Boards to use the new curriculum. This strategy came into effect ten years after the curriculum guideline's first release, and was a departure from the previous co-operative approach to curriculum change in Ontario. As mentioned previously, the MET used the structure of course codes and refused to accept the old course for official recognition, thereby, forcing compliance. With this approach, the resistance of some Boards' teachers to the policy became polarised. Where extension by the MET gave apparent universal provision for technical and vocational education, some schools now, in effect, withdrew from providing technology courses (MET, 1995).

The MET does not state goals for curriculum documents in relation to outcomes for any students, including the low attaining student. In Ontario, because of Part A of the technology policy and with differentiation, it was assumed by schools and the MET staff that all students would benefit equally from the initiative, but this was not the

case, as shall be shown.

5.5. Review of the Technology Policy

Analysis of the technical policy brings us to a further evaluation in relation to its stated aims and uses the inclusive common core of the policy as the basis. Did the policy have the intended effects or were there unintended effects? In this instance, at the school and classroom levels, did the technical initiative equally serve young people across the ability streams?

Analysis of these issues occurs on two levels according to Gregg (1976). The first is change in the authorised rules, which in this case was the MET changing the curriculum guideline, introducing the contract with its application content, changing teacher qualifications and the course codes as discussed. The second is output evaluation. Output was an aim in the application; its expression was in terms of student enrolment, the only outcome attended to in Ontario.

Employability has not been a school level concern nor evaluated as part of education research. There were no studies of improved skill levels of youth after the curriculum changes and funding with only the enrolment patterns kept for planning purposes.

The concept of output according to the MET staff (1991) is curriculum programmes. They suggest (ibid.) that because of political events, the changes in government warranted action to institutionalise the curriculum programmes. Two government changes occurred after the release of the documents. TEPERF targeted funding became the first direct government intervention of the NDP in school curriculum. Formerly, this had been the jurisdiction of the educator. With the NDP, all government parties now became interested in the activities of the education system and began subjecting the system to their particular interests.

The NDP party normally interested in Labour, now with responsibility for the economy, used TEPERF as one opportunity to form relationships with industry. Education subsystems had to prove that they could make the links to industry. The need for industry links came about politically to address the deep structures in society for reform of entrenched biases, to improve the economic and social conditions that reliance on technology was introducing.

reliance on technology was introducing.

The subsequent 1995 Conservative government emphasised deficit reduction. Policy that did not require funding, such as the course code elimination, was acceptable to ensure that change was made in school technology programmes.

How to evaluate the technology outputs in light of these political events, given the reluctance of directors to reveal attainments for students, becomes a dilemma. Remembering Sarason's (1990) concern about the problem of incomplete conceptualisation of alternatives alerts us to some issues. Using a researcher may have resulted in some recognition of the connection between schooling and youth unemployment. While it may seem self-evident that students that have experience with the new technologies have a better chance than others on the labour market, the overall employment of youth continues its relation to the performance of the economy.

To address those issues and maintain some critical stance in the use of scientific techniques, Habermas (1974) suggested that in industrial society the only way in which the relationship between theory and practice can be achieved is through the use of scientific and statistical research techniques. Research and technology are then at the same time both subject and method in his view.

Gregg's (1976) analytic framework supports policy examination from the perspective of neglect, in practice, to attend to the low ability and non-attaining students. The policy implementation did effect the legal capacity of the least privileged students in the following way. Each stream of students is to have equal opportunities in school, as stated. Since the policy focused more interest on the advanced students, teachers and the system directed their efforts towards those students.

During this time the education system was experiencing funding reductions because of Cabinet direction. With redirection of finite teacher resources to implement the new policy, there was no replacement funding for these staff. Therefore, less attention was available to others, notably, to the lower attaining students. At the same time, this limited the participation by the basic level student in the new curriculum because the MET did not advocate in the system for them. All

educators were aware that the new method defined as project driven and problem-solving was beyond the capabilities of the less able students (MET and Board Interviews, 1992, 1993). Because of the reading levels and overall direction (Interviews, 1993), the objectives of the courses are suitable for the other two levels. Many Board teachers continued their original courses designed for these students with the knowledge that the current certification did not provide for employability.

The TEPERF allowed for running projects in Ontario within 12 months of its announcement and extended up to five years without any evaluation. While this timeline indicated adaptability (Gregg, 1976), it also indicates that the funding of equipment did not create the substantive change that the new curriculum was to have. With the changes in governments after the curriculum release, there were delays in the initiative internally in the MET due to those changes and lack of staffing for implementation. At the school level, the disruptions occurred owing to either, the students not selecting the new courses or to the overall enrolment declines.

With the failure to maintain the implementation process in the curriculum branch of the MET, the alternative strategy was to use Regional Office personnel in a working committee. These staff had not been involved with the curriculum development, and therefore, raised questions of their acceptability in the field. Classroom teachers saw themselves as the experts, since they had the contact with the students and the experience of attempting to implement the curriculum with the full range of students.

Stability is an issue for the review raised by Gregg (1976). For education stability meant not only that the changes could be made within current structure without major dislocations, but also that MET attend to the issue of the least privileged, i.e., the basic stream, by improving their employability. As noted in the first point, the teachers found the new approach unsuccessful for low attaining students. To prevent the students from withdrawing or failing courses, teachers, according to the technology co-ordinators (interviews, 1993), continued past practices to accommodate these students. This stabilising of the schooling for students was a response to unsuccessful change at one level, and an attempt to maintain a previous school approach at another level. During this time, teachers had no time to explore alternatives to

increase the attainments of these students. The MET did not respond to school comments made on behalf of the non-academic students, and the decreased flexibility of courses resulted according to teachers because of the course amalgamations.

Some stability of the system occurred using the strategy of new equipment to introduce the new technologies when combined with work experience, these strategies allowed the advanced and the general level students to work with professionals in the field and to be in an setting beyond which the teacher or school could provide (technology directors, 1993). This enhanced their employability.

The implied consent of schools and teachers through the application process cannot be considered willing (Gregg, 1976) given the disruption trade-based teachers experienced; the disruption worked against the stabilising effect that the funding of the changes introduced. With extension, teachers' consent was not a consideration nor was there informed consent involving the students. Historically, the MET and the schools treat students as passive recipients of policy effects even for the token selection of limited programmes or consent to the course level. Students more likely are unaware of education choices.

Information-generating properties (Gregg, 1976) of the curriculum and the high-end equipment provided a positive image of the TEPERF with industry. The more academic intent generated advanced students with higher skill levels to enter the world of work in the future. The TEPERF specified how to do this, in part with the new curriculum and the distribution of funds on new school equipment. The policy document states:

> The acquisition of microcomputers and high-technology equipment for such areas as computer assisted design (CAD), computer-numerical control (CNC), and robotics requires a high degree of planning.

Therefore, the disbursement of the targeted funds for new equipment became the output of the policy, which the MET monitored to ensure that the equipment was in place.

Ultimately, the initiative controlled the behaviour of teachers through the consolidation of courses and the prescriptive material for the methods of teaching rather than the former discretion to develop their

own curriculum for students. The technological methods extended to the entire range of subjects in those schools that attempted to implement the concept of interrelationships. The initiative could direct the entire curriculum with computer applications to various subject areas.

An example of this occurred with computer-assisted design (CAD) which had applications to construction, home economics, and art. Curriculum extension created the impression that the projects were successful (Lawson, 1986, cited in Ball, 1990) and that the initiative improved the employability of the secondary students, although there is no concrete evidence to support that view. Due to the aura created around the leading-edge technology at the local level, there was the impression given to parents that the local schools were leaders in technology. However, there was no substantiation of this.

The error-correcting capacities of the decision-makers (Gregg, 1976) were reflected, in part, by some applications for equipment that had not been approved. The MET refused some applications for reasons that were not widely known beyond the individual school that was refused. Why an application was not accepted remains unreported other than 'problems in the proposal', which the school could correct with re-application (MET, 1991).

Error correction was open to the MET in the form of a shift in the policy direction, either formally or informally. The addition of funding equipment to gain acceptance for the new curriculum illustrates the first formal 'correction' by the MET. Later, the MET's refusals of ongoing funding for approved projects and the formal end to a project indicated further corrections that in reality were budgetary problems. From year to year, the approval criteria shifted in part due to better evaluations of applications by the MET (ibid.). The level, at which corrections occurred, though, means that the MET contained the difficulties without any public awareness.

The Minister and his office did make inquiries in some instances, but generally supported the MET's committee decisions on applications. For the students of interest, the job preparation through more relevant schooling has been foregone without wider public awareness. No employability outcomes for any group of students exist; therefore, this form of information was unavailable for continuous improvement of the

curriculum.

A lack of awareness existed with the second correction involving the course codes to force installation and with the third correction regarding the teachers' qualifications.

5.5.1 Structural Implications

The structural changes made guided behaviour, guided regulations, generated programmes, provided broad directions and guided the policy-making processes itself, the meta-policies (Downey, 1988). In Ontario, disruption of individual teacher's behaviour occurred in delivering curriculum. The governments' directions placed in practice a universal curriculum model but only in some secondary schools. Rather than a universal implementation, which the document (1985) implies, the practice in fact became a redistribution of resources to the advanced students. At the Board level, the technology directors (1993) are of the opinion that the overall pattern of participation by students was not significantly changed.

The rational-comprehensive approach attempted both in the curriculum documents and the approach to implementation system-wide became diffused. While the basis of the documents was rational from the perspective of the governments, at the school level their poor reception indicated some unexpected effects. An increase in workload for teachers, which was the result of trying to provide projects of interest to students, was one of those effects. While the use of the Ontario teacher electronic network to keep teachers informed of recent developments was a comprehensive strategy to maintain up-to-date knowledge on technology education, in practical terms, the network was over-subscribed and impossible to access during the school day (ibid.). Many teachers indicated they were unable to obtain professional development during this time of rapid change.

Therefore, while incrementalism occurred with the varying directives with full extension, the initiative was not in all schools due to funding, local priorities, lack of qualified teachers and teacher resistance. Some schools found themselves forced not to offer technology altogether. From the viewpoint of equal opportunity for all students, inequalities were more apparent in total, given the way that this implementation developed. Further, as the policy extended, experiences

of funding shortfalls occurred because of equipment maintenance. Rather than the rational-comprehensive curriculum being in place, disorder occurred in those programmes that had trouble with equipment breakdown. The direction of the programme stopped since there was a lack of expertise, system analysts and technicians, for example, in the Boards, hence, Ontario teachers (1993) reverted to their old curriculum.

Therefore, at various stages, selected approaches were more evident, but in the broad picture owing to the local Board pragmatism a mixed approach resulted. With the emphasis of education shifting to subsequent policies in 1991, namely, the 'Common Curriculum' in Ontario, a 'non-model' became evident (Downey, 1988). The Boards moved from one choice opportunity to the next for funding (ibid.). There was no real notion of establishing a balance between academic and non-academic curriculum (senior MET interviewee, 1991) or providing the basic level students with equal opportunity to attain employable skills.

Technology remained an optional subject that is not required for graduation from secondary school unlike subjects like mathematics or language. Meanwhile, some of the skills that technology tried to provide students are emphasised in these other disciplines. The enrolments in technological courses decreased as a result of the implementation problems and an overall decline in student numbers (MET, 1991).

Announcement of the extension of technology from the project phase was with the knowledge that it did not make a large difference to secondary schools and skill development for students. Thus, the effectiveness (Hill and Bramley, 1986) of the policy questioned by Board personnel needed further study as the enrolment results became known. As to the curriculum management at the individual classroom level, teachers had to adapt the approach in relation to their class.

Other factors at the local school level influenced the curriculum implementation, which in turn influenced the attainments of the various streams of students. In smaller schools where the enrolments meant grouping the streams together, the directors noted that their teachers had organisational difficulties trying to address each group's needs. Teachers found that there was no time allocation for them to learn the new technologies particularly during the 'Social Contract' restrictions of the NDP budget. One interviewee observed:

> The new equipment is still in the crate and _____ hasn't asked for any help in getting it going. It's [the equipment] been sitting there since the fall, and it's not going to be used this term (1992).

Given that teachers felt ill prepared to implement the curriculum with the mixed groups in class, the curriculum introduction was in less than ideal circumstances. In one instance, a large Board introduced a programme that was contradicting the MET policy, but there was no MET authority to prevent this from happening. This was not the first occurrence of this sort, and the Boards were aware that the MET had no means to sanction them when they contravened policy.

Any technological innovation beyond student access to the high-end computer equipment for projects as the means of delivering the curriculum was unexamined. Some directors (1993) considered the merits of this sophisticated equipment highly questionable for some students, albeit, some of the bright students who elected to take technological courses. Some teachers (1993) were of the opinion that some of the equipment was all 'bells and whistles... which had high PR (public relations) value', but 'little learning value once students learn the commands'. The teachers concluded that various computers did not challenge students unless problem solving was involved in the applications.

Stable employment of resources (Hill and Bramley, 1986) with incentive funding was not a factor even with a situation of rapid transformation. As mentioned elsewhere, the Minister and the Minister's office questioned the MET staff on the success of applications based on complaints of schools or the Boards. The unequal funding to schools may account for the rapid extension. The extension occurred without funding by the second Conservative government. Further inequities in funding resulted, and was reflected in what students received as curriculum.

Rules, an aspect of evaluation, lost their authority base when the MET lost its leadership in curriculum. The rules also lost their constitutional basis for the equal treatment of students. Furthermore, when each school developed its own technology curriculum with its interpretation of the guidelines, the result was less curriculum comparability. These developments meant that the legitimacy of MET was questioned as the following illustrates.

> I've been teaching these students for twenty-five years and they haven't changed.... the programme is fragmented now and I have all these different groups in class so I don't have enough time to deal with the lowest group (classroom technical teacher, 1993).

Health and safety concerns raised by school personnel centred around supervision. With groups of students in different locations, teachers could not see all the students. Classroom teachers (1993) felt very vulnerable to litigation, since they are responsible for classroom safety. The Boards with financial difficulties were unable to make the planned renovations, which resulted in programmes being cancelled. Because the safety legislation gives teachers the right to stop work if there was a safety concern, major disruptions occurred; in one instance a class was cancelled for the term.

During this time, the MET personnel did not know what would be a well-implemented programme in terms of outcomes according to some teachers (1993). Some classroom teachers were so overwhelmed with the curriculum demands that they considered them impractical and not providing skills for employment locally. In their view, some of the student outcomes could not be achieved within the timeline and structure of courses as defined, given the variety of learning rates (ibid.). Teachers cited these reasons for not implementing the documents in addition to the Social Contract mentioned.

The initiative was unchallenged as to its relevance in a public manner, which indicates that the different governing bodies, knowingly or not, supported the approaches taken. Some teachers (1993) were of the opinion that the various governments did not know the students, the curriculum or the implications of their policy at the grassroots. In the evaluation of the policy, teachers thought the various governments were unaware of the outcomes that indicate success for all students. In all instances, the governing bodies allowed the MET to make decisions as to what was acceptable policy and application proposals. During the term of the NDP, the Minister announced the approved applications and funds to the Boards. Previously, however, the government only announced the initial initiative and its funding. When the 1995 Conservative government announced the removal of old course codes and the end to special funding, some believed that this was an indication of the loss of confidence in the MET by government.

Vague policy statements created problems of shared meaning (Ostram, 1976). This occurred between the bilingual sections of the Boards, each with legal rights based in the Ontario Human Rights Code (1977). Other minority groups in Ontario without official standing went unattended in technology because for about 50 per cent of them English is not their first language. A disproportionate number of these students are registered by schools in basic level technical courses. Major adjustments occurred in the largest Board in southern Ontario as they attempted to establish meaning with their student population. Linguistics did not affect the rest of the schools in the province to the same degree, and those areas complained that MET policies were solutions for the southern Boards.

Other problems occurred due to real differences in the various multicultural subsystems and groups in Ontario. Their multiple experiences mediated by language give the impression of differences in practice. The MET's argument is that students had to accommodate the demands of the larger society in terms of schooling, skills and employment. The final interpretation of the curriculum was the responsibility of the students.

For our present purposes, approaches that prevented maximising the benefits to all ranges of students require questioning. The issue of outcomes, which is the usefulness of the certification of schooling attained by students, is the benefit of the system. None of the participants in the three respondents groups addressed this issue. The conclusion was that the range of approaches presented throughout the implementation system was unconcerned with demonstrating change in outcomes for the full range of students. Based on the three streams, the main interests in and competition for, are those advanced students who go on to post-secondary schools because this group reflects well on the school and its teachers (Interviews 1993).

In Ontario, the students who were the object of policy implementation, had no voice except through parental votes for the politicians who represented them. With the NDP (1988), there was a provision for student representation from the council of students on a Royal Commission to examine publicly funded schooling. However, this involvement was not characteristic of the education system as student membership on committees is a recent development.

With the TEPERF, accommodation of the general and basic level students was not at the level that they had formerly in technical workshop classes. Before the TEPERF, the MET thought that equal treatment had been a principle to which they adhered (1991). How this provision represented what was in the best interest of the academically disadvantaged students went unevaluated. Some MET personnel (1992) had in-service on the German model at their annual conference and were aware of the potential attainments for this group of students. At the same time, the MET staff had not accepted working with industry or labour groups, which the new approach involved. This illustrates how the MET staff protected their territory and how one section worked against another within the same department according to a senior MET staff (1991). One explanation was that the formerly neutral or professional civil servants had become politicised (ibid.).

Why does education keep the non-academic students in schools? The funding mechanism for schools (Interview, 1991) provided one motive to try to keep students registered. Per-student base funding relies on the number of students registered. When the curriculum does not meet student needs, they withdraw and a misuse of public funds occurs in the long run. The TEPERF intended to prepare students better for their future. Fullan's (1992) observation in his review of technology education for Ontario was that it was 'murky'.

The effect of the budget cuts resulted in a failure to replace some retired staff or those reassigned. In many areas, there were no personnel to carry forward the changes through the system. In the technology area at the central office level, following the retirement of the co-ordinator, there were no permanent staff left. A secondment using a Board staff was in effect for two years, but due to the uncertainty within the MET this position was discontinued. The secondee was unable to effect decisions due to the temporary nature of the position (MET, 1993). A team leader within the MET assumed some functions characterised as 'sunset' activities, meaning that the TEPERF ended without the planned evaluation.

With the changed direction of the technology courses, the non-attaining students have fewer options as schools move to the project orientation. Those students needing more support and direction from the teacher were

doing less well (Interviews, 1993). Those teachers who did not adopt the new programmes still provided the trade-based courses for these students. Yet, these teachers came under more pressure from the rest of their colleagues with integration of subjects, with others teaching the technology content and with the demographic decline in student numbers, meaning competition was occurring for students. This form of competition was not an effect of the market ideology of the government.

As noted, technology is not a requirement for a secondary school diploma and remains as an elective opposite business studies. Since business studies includes keyboarding, its popularity is reflected in student choices. Many of these factors reflect the politics within schools and the MET among subject areas and their teachers. Historically, because technology was associated with trades and the less academic students, the overall position of the technology department remains second to others. Finally, while some school personnel have a wider view than their subject perspective, many did not concern themselves with other issues related to student learning needs.

The teachers were aware that there were changes in emphasis between the release of the documents and the funding. These changes meant that schools moved in a variety directions after the document's release and then, with the funding, were pointed in definite directions. Ultimately, the teachers (1993) believed that the education system had tried to implement a policy that was open to a variety of interpretations. The policy statement, while reaffirming the policies regarding general, basic and special education at the same time as increasing teacher qualifications with university courses, threatened those with trade qualifications. All eight of the interviewees at the school level indicated that, because of the emphasis on the advance student, neglect of the basic level students occurred. These teachers had difficulty delivering a programme of study to these students based on the new guidelines.

5.5.2 Functions of Technology Schoolteachers

The following sections on the four functions demonstrate how the school personnel responded to the policy and implemented the guideline to fit their circumstances. Because the implementation was uneven between schools the length of experience with the curriculum varies. The four functions reveal the teachers' responsibilities for policy

implementation at the school level as they provide technology curriculum to low attaining students.

5.5.2.1 Planning

The first four questions reveal that the Boards' personnel are not new teachers (Q 1.1). The 60 respondents to the questionnaire (1993) were the head teachers of their technology department or the Technology Directors in the schools. The differences in these titles are differences in remuneration for positions of responsibility and time allocated for administrative duties.

These head teachers had held their positions (Q 1.2) for more than five years.

The technology teachers (Q 1.3) had on average 25 years experience with students and the curriculum; these teachers have experienced several policy changes and are now nearing the end of their career. They had seen the shift of technology education from opportunity classes to a trade-based discipline targeted for non-academic students and now to the academic 'high end' emphasis for which they lack qualifications. They and the rest of their department needed extensive professional development either, at the Board level or in Faculties of Education.

The final question (Q 1.4) on these teachers' background indicated that with one exception all of them have only their original trade-focused teacher training. Their trade loyalty remains, and this loyalty, together with many years of teacher in-service training, explains some of the resistance to the direction of the TEPERF; another explanation is that the failure to retrain the teachers may have been a major deficiency of the implementation.

How did classroom teachers plan to install the new curricula? This section of the questionnaire examined the planning activities of teachers in determining learning activities.

The amount of time (Q 1.5), on average, spent by personnel on planning activities was 30 per cent of the workday. In the main, this indicated the teachers' focus was on teaching. This result may reflect a contractual item relating to teaching duties and may illustrate a deficiency in planning for the new curriculum. The administrative

functions were managing classroom issues, managing staff issues and general management meetings, both formal and informal which used 25 per cent of their time. Little time was available for low attaining students.

Seventeen administrators made some efforts towards the new curriculum. Those personnel interviewed (1993) elaborated on this planning effort. The development of the original application was the extent of their planning. Most purchased their curriculum from commercial developers associated with the equipment they purchased, or from other Boards (interviews, 1993). Little time was available for the basic level students (ibid.). Given the shortage of time, these teachers adapted the curriculum of larger Boards to their school. Therefore, the curriculum was not original. Their contacts in the larger Boards had curriculum staff available who had some experience with the materials in the classroom.

An example of one teaching unit that was adapted that interviewees mentioned (1993) was designing model rockets which students then launched. This unit was very popular among both the teachers and the students. However, due to the science level involved, the basic students did not use it. A commercial model that these students could build was available, but it did not involve rocket launching or the scientific aspects of the lessons.

The foregoing illustrates in part the point that Oakes (1994) makes in terms of the low level of programmes received by students at the basic level. A conflicting point of view made by the teachers was that the students in question were challenged enough just following the instructions for the commercial model.

(Q 1.6) The articulation of the scope and sequence of the technology curriculum was the responsibility of head teachers or Directors. Both external and internal curriculum committees ensured that the curriculum does not overlap between grades. Sixty per cent of programmes, according to respondents, had been planned with a view to what students had been exposed to in elementary school programmes; duplication of course content or gaps in the curriculum often happened.

Within the technology department (Q 1.7), there were meetings between

the grade level staff. About 21 per cent of the teachers met with elementary staff.

The purpose of most meetings in secondary schools (Q 1.8) was the planning of student courses (time-tabling), meaning that time-tabling was done manually and that computer software designed to address time-tabling was not used (Staff interviews, 1993).

(Q 1.9) The technical-vocational teachers were assigned most frequently to link programmes, followed by guidance staff, and then special-education staff.

The programming scope and sequence (#1.10) or articulation was assigned specifically or only to one staff person in 61 per cent of the schools.

Both students and parents (Q 1.11) in 30 per cent of the schools were involved in the programme planning process with the guidance person and to achieve the parental consent requirements.

The final choice of the student's programme (Q 1.12) was left to the students and parents taking into account the requirements of OS:IS (1977; the policy document for secondary school credit and course requirements) followed by availability. Not all seven consolidated courses were available in all schools. The teachers' qualifications and the enrolment numbers determined the availability of courses.

The respondents (Q 1.12.2) reported that they had a professional responsibility to students when their programmes were not working out for them. Adjusting the curriculum programme was done by 65 per cent of the respondents. The issue was passed on to the guidance department to resolve by 30 per cent suggesting that some issues were beyond their training or capacity. It should be remembered that programming for students at the basic level is part of the policy document (see Appendix C).

No formal assessment (Q 1.13) was required. Sixty-six per cent of the respondents report there were no requirements for formal assessment of students.

Special-education teachers (Q 1.14) provide some assessment for students

that were referred. The number of designated special-education students integrated in a class reflects the integration practice but with many needy students not assessed according to respondents and interviewees (1993).

(Q 1.141) To command classroom support at the basic level, the student and parent may request identification as special-education (needs) students and there was the possibility of appealing that designation in 50 per cent of the schools.

> Parents always have the final say regarding assessment of their child and may reject any finding or recommendation.
>
> if basic is not wanted - they can simply decline-
> also, can choose basic if wanted.

The importance of designation is that it becomes the means for providing resources and support to the student in secondary school and beyond into additional programme supports for further education and training. The student, with parental support, may insist on taking a course at another level of difficulty, even if failure is likely. Fullan (1984,91) indicates that parental involvement was critical if schools are to have an impact on students.

(Q 1.15) All teachers had responsibility for checking student progress across subjects.

(Q 1.6) A majority, 61 per cent, of the technology teachers reported that their involvement with planning for students across disciplines within a school.

Progress reports (Q 1.17) were reported to be part of the regular staff meetings or at least every two months and at the end of term when promotions were discussed.

(Q 1.18) Monthly meetings using various teams and reporting mechanism were the processes used to follow students having difficulties. Performance, behaviour and attendance were the most frequent reasons for 'flagging' students at risk.

(Q 1.19) Not doing the work or difficulties with communication (reading) were reported by 40 per cent of the respondents to be the main reasons

for students not doing as well as they are capable. Listening, writing and attitude were contributing factors for students not doing well.

(Q 1.191) Sixty per cent of the respondents thought there usually was more than one cause resulting in lack of success for students which reflects the multifaceted problems for which the teachers were planning.

To better understand these students the next question (Q 1.192) asks which was the most influential cause in the opinion of the respondent for the students for under achieving. The respondents reported that attitude together with ability were equally influential with absenteeism also a factor.

(Q 1.20) Teachers had many suggestions for improving the school programme for students, such as, class size, more out of school components, volunteers, support from parents, other subjects supporting technical subjects, begin 'tech' subjects in junior grades, updating of the curriculum for meaning, active work experience, conference with students, show interest, support students peer tutoring or mediation.

To conclude, planning at the school level was not a major emphasis of the technology head teacher but teaching and time-tabling issues were. In-service training or professional development, the most effective methods for implementation (Fullan, 1984) were not mentioned. The most successful in-service training focuses on the job and programmes that teachers deliver and must be of practical use to teachers to move implementation along (ibid.). The failure of this policy to attempt changes in practice in cognitive skills and personal and social skills was raised by interviewees(1993). The use of planning opportunities for time-tabling and not for the implementation of new curriculum programmes accounts for this bias.

5.5.2.2 School Policy and Procedures

The introduction of the new curriculum policy had implications which needed to be reviewed and conveyed to the students and for the policy and procedures at the school level. Seven questions examined this implementation.

(#2.1) Most often, changes such as the course consolidation were conveyed by giving a handbook to students at the beginning of the school

year. In Ontario, only five schools had statements of purpose. Working together on stated goals for students is an indicator of an effective school (Rutter et al, 1979). All teachers may not have been working towards achieving the same goal (interviews, 1993). The guidance teachers controlled the students' timetable. The respondents did not have a means of evaluating whether their school was relevant by improving opportunities for students. Modification to the syllabus was the most known procedure (56 per cent), whereas the way to extend course time was the least known (8 per cent). Where professional roles, qualifications, transitions between divisions, course selection and levels of difficulty were matters of government policy, teachers were only partially aware that these guided school policy. Legal requirements were better known according to the respondents.

(Q 2.2) Teachers showed more interest in the curriculum framework (56 per cent), behaviour codes (51 per cent), and linkage (50 per cent). There was little interest in student appeal procedures (5 per cent) which challenge the authority of a school. This does not involve the student with these school structures to solve problems.

The heads of the technology departments did not differentiate between technical and vocational education in their courses (Q 2.3). The trade background of these teachers was both technical and vocational, and therefore, not differentiated or related to courses. They also did not differentiate between practical training and technology education. In part, this response reflected a continuum of low- to high-level knowledge. As one staff indicated (1993):

> It doesn't take a rocket scientist to use some of today's technical applications in everyday use like banking machines or voice mail.

The definitions of practical training, vocational and technical education did not equate to the basic, general and advanced courses in the respondents' opinion. The difficulty was separating students in a course and at the margins where there was no clear school policy. Often, given the same ability, hard work and a good attitude determined whether a student obtained a course credit (the value given to one course) at the higher general level (Interviewees, 1993).

The proportion of work experience (Q 2.4) was not organised differently for different types of students but the skill level attempted was based

in the curriculum.

(Q 2.41) The technology head teachers thought that their school practices reflected the policy in nearly half of the instances. By extension, that also means that for almost half the time practice did not reflect the policy. It was unclear what guides their discretionary behaviour in the latter case (Interviews, 1993). As noted earlier, the level at which students earn a credit influences future career opportunities, because of entry requirements; interviewees (1993) had little information regarding the lifelong implications of this issue for students. Their interests were centred in the school, and most interviewees did not think that schools should extend into the community or workplace. These teachers regarded out-of-school considerations as the responsibility of the students and their families.

(Q 2.5) The head teachers divided equally on the question of resources critical to the policy. Technology departments have a limit of 20 students, set by school policy for health and safety reasons of the shop and trade-based classrooms. However, due to the practical nature of these courses, more students with behaviour issues were placed in these classes.

The teachers suggested the policy could be improved (Q 2.6) if the students were working in the community with business, on projects, on co-operative programmes and had more time for technology studies, smaller class size, upgraded equipment and if there was liaison with other departments to reinforce skills. One respondent indicated that more practical work using 90 per cent of the course with 10 per cent theory balance would assists student attain the course content. Greater integration of curriculum with mathematics, science and English, subjects seen as academic was also recommended.

To advance improvement in school policy (Q 2.7), the technology heads of departments worked through the management hierarchy. Some (41 per cent) head teachers used this avenue to suggest improvements, but clearly half of the respondents did not believe in the possibility of effecting change in the education system. This speaks poorly of the sense of teamwork or participation by these staff to make improvements.

(Q 2.71) Less than half (18%) of those in a position of responsibility

in their department were successful in making changes. Since technology heads regard the system of education as biased in favour of the academic departments, this attitude may reveal that bias and the new changes to curriculum policy. The thoughts of interviewees (1993) in this regard were that the relationships among the school staff were critical in terms of priorities addressed by the administration. Most felt that the competition between departments to attract students and the attitude that technology is a 'second-string' course influence student subject selection. The personal beliefs regarding their principals were a determinant of school policy. To the regret of the teachers, seven of the eight interviewees did not consider the working relationships as participatory

An example of school level issues concerned a lab setting that an international company had donated to a school. While the classroom no doubt was unique to a secondary school, the criticism was that, given the money, any school could attain the same equipment and student interest. However, for the schools not funded in their Board that option was unavailable because of the lack of sponsors in their area.

For some of the funded schools, the teachers did not necessarily agree that the use of sophisticated equipment develops students' thinking skills. What they were attempting to do in their curriculum area was to identify real problems that need solutions, and to have students work on those. Designing a usable, economic solar electric car was one such project. Some classes competed for this problem solution and developed solar cars for city use that eliminated all pollution. The wider understandings that students gained were of the marketplace and the development of suitable options for it. As can be seen from this example though, the student at the basic level were not capable of this complex learning activity in the experience of these teachers.

5.5.2.3 Programme

Sixteen questions examined programme issues faced by the head teachers of technology. After planning activities and establishing school policy in relation to the TEPERF, the relevance of the technology programme was determined at the classroom level and controlled within the understanding of the teachers.

(Q 3.1) Ninety-two per cent of the head teachers did have a high rate of

involvement and control of programming. They defined the actual course content in the curriculum. In other words, they determined what were relevant courses based in the trades and trade qualification requirements. For students accumulating hours towards a trade qualification, the trade requirement was included.

(Q 3.2) There was a high rate of flexibility on the route to attainment in courses (87 per cent) and between courses (78 per cent). In the policy on course delivery, the MET encouraged (1985) the following alternative modes of delivery:

> correspondence education, continuing education (evening courses usually for adults), co-operative courses, and individualized instruction.
> Exploratory courses and general interest courses are also encouraged as are multi-grade classes and bi-level classes to accommodate the needs of the range of students.

(Q 3.3) Only 68 per cent of the respondents' schools had alternative routes available for student choice, which although high means some students had no options in their course selection.

(Q 3.4) The amount of time allocated for out-of-class or work experience was most frequently one week followed by two weeks. These teachers developed the placements, which was a very time-consuming activity given their other responsibilities. Interviewees (1993) indicated at one time, in larger schools, special resource teachers were designated full or half time to do this; staffing cuts have largely eliminated these positions. This out-of-class option was separate from the co-operative education option, which was also available for learning technology.

(Q 3.5) All students may have had a work experience but it varied by the school and the community. Foundation students had access in 59 per cent of the schools while 61 per cent and 51 per cent of respondents' schools provided work experience to general and advanced students respectively. There was competition for work placements in communities among community colleges, apprenticeship programmes and community placements for young offenders. Therefore, head teachers reported that student behaviour has to be appropriate before and during the placement to maintain good relations in the community.

Placements were less frequent in the fourth year of secondary school (57 per cent), followed by the third year (61 per cent): on specific reason

was reported for choice.

(Q 3.6) Fifty percent of the respondents indicated students could have an extension of their work experience.

(Q 3.7) In 67 per cent of the schools, for basic level students permanent job placements were a practice for the secondary school programmes. Parental consent and student agreement was necessary.

(Q 3.8) There was the opportunity for work experience in more than one placement to allow students to explore career choices, according to the 57 per cent of the respondents.

(Q 3.9) Other subject areas made work experience placements, but the technological programmes have a rate of 87 per cent, more than twice the rate of the others.

Many of the professionals had thought that, with a change of government, the policy direction would change again, but it did not. The teachers who did not change their programme lost their jobs. This effectively was the MET control, which created resentment in some schools (School Interviews, 1993).

(Q 3.10) The teachers explored a number of alternatives when their students were failing one of which was to look to special-education teachers for assistance. The other alternatives used were school and work programmes, adjustment in class programmes, counselling, out of shop programmes and parent interviews.

The causes for lack of progress are complex and no one approach was used by the respondents. It may be beyond the capability of the classroom teachers or the teachers in charge of technology education to support students for successful attainment. Often, a teacher did not feel responsible for dealing with the other issues involved. Guidance was another resource to which these teachers refer their students.

(Q 3.11 and Q 3.12) Most respondents did not answer the questions dealing with outcomes. Some respondents expressed their frustration on the questionnaire and during the interviews about the lack of some students to progress. It would be informative to know whether, if formal

assessment were required whether rates would change. As the test criteria used for placement varies by respondent, criteria becomes more critical when requesting a specialist assessment. Some teachers believed that some of these students should not be in school and should have alternative options open to them. One teacher said, 'Give me students I can teach' (1993).

(Q 3.121 to 3.123) The respondents did not provide the percentages. The following is a summary of the comments. One emotional issue for students was examinations. The issue of student attainment on examination was then on the political agenda. The debate centred on introducing provincial testing. Meanwhile, local teachers were resisting the removal of testing from their control. According to the eight interviewed (1993), the negative interpretation of this information was often that poor test results were a reflection of the teaching or teacher.

The argument that teachers are one factor in student attainment made by Rutter et al. (1979) along with the complex interaction between ability and social or emotional factors makes clear directions to teachers difficult. The needs of students addressed in a typical classroom situation meant that individual attention to a student is less than ten minutes a day according to the teachers (op. cit.). The following is one view of what is needed:

> Shorter class time in each area, more subjects, less daily time.

(Q 3.124) The respondents' low response rate regarding finishing a course by withdrawal from examination or from school means was invalid.

(Q 3.125) The rate at which students were staying on or withdrawing from school was invalid on the questionnaire. The technology directors on interview (1993) thought non-attainment reflects not so much on the student's schooling but on personal circumstances. The budget for hiring teachers was committed based on the number of students registered. The incentive of teachers to maintain students in school then concerns the progress of students to successive years and involves school relationships.

(Q 3.126) This question also had a low response rate. Respondents and interviewees (1993) did not compare attainment in technology as compared to Mathematics and English. Comparative information is available to

teachers at end-of-year promotion meetings. Although previous term attainment information is available, many reported the practice of not comparing attainment to prevent bias and they claimed that it is too time-consuming to look up previous student progress reports (ibid).

Generally, at the end of examinations the administration looks at failure rates of teachers and classes. The general acceptable rate of failure is around 10 per cent and teachers have to explain higher rates. Generally, this issue is not open to public debate. The public and individual students and families could contest the attainment if they realised the professional rules of discretion at promotion meetings.

On one hand, the foregoing is an argument for provincial standard examinations. On the other hand, student evaluation is a very contentious issue according to the directors interviewed (1993) and they suggested practical work-based demonstration for evaluating low attaining students. Those directors that support mastery learning did not advocate moving students ahead for social reasons. Placing students in learning environments where peers generally know their non-attainment was one reason these students withdraw from school. The sensitivity to peer opinion in this age group, some directors suggested, is a reason for building a successful school experience in a classroom of students functioning at the same level. Building relationships among students so they become supportive of each other is a major role of the classroom setting. For those students with personal issues, the only positive relationship available to some is with the teacher.

Technology directors (1993) commented that a significant number of their students did not have any supports within the student group. While directors reported the need for some support system for these students leaving school, nothing was available in their communities.

(Q 3.13) The establishment of zero tolerance in the school behaviour codes, supported by the teachers, excluded a significant number of students with negative behaviour. Some respondents reported expulsion of more than half their classes at some point over the school year. With adolescent development normally a stage of questioning authority, there is an inherent contradiction in the teacher-student relationship around authority and power, students' development, and interest in learning. The secondary rate for dropouts of the basic students of 53 per cent,

(Fullan (1992)) is in part due to behaviour. Although teachers identified this population as very needy, those interviewed consider many needs of these students to be beyond the mandate of the school. One suggested:

> Commitment to helping these students and by not just pushing them ahead.

Specialist technology teachers were frank in being at a loss in attempting to meet the needs of these students, given the demands of the curriculum. Most worrisome to them was the responsibility of planning the curriculum for these students unaided.

Some teachers indicated that school size affects programme. School size range from less than 100 students to near 2,000, the average being about 1,030. For young adolescents, the experience of entering secondary school, according to the NDP policy document on the first year of secondary school presents problems of transition. As social or emotional issues dominate the agenda of the students, schooling frequently takes the back row. The integration of support services with education for this group was a policy position of the NDP (1990), but it remained unimplemented before they left government.

While there was a policy in special education to integrate these students in the mainstream, there remained the model of segregation, which the interviewees support. They did not have the background and training to manage these students in large classes where the focus is on the increasing specialisation of the discipline. The 'forcing' of these students on teachers results in segregation in a classroom and a less than adequate curriculum for the students. The decline in student numbers after the 'baby boomers' went through the system resulted in teachers and their federations wishing to support the policy of integration. Their position supported their employment according to a technology director who is also a local federation president (1995).

(Q 3.14) The technology directors were positive towards considering practical experience that has apprenticeship value. In the interviews (1993), when discussing certified work experience, the teachers were receptive to considering alternative forms of learning for these students. A new initiative was the trend to open more apprenticeships at

the local level in non-traditional areas. Schools could become involved in providing these programmes. Owing to the separation between secondary schools and the agency that develops the programmes, schools did not recognise this opportunity or did not have the time to become involved in exploring alternative delivery methods outside the school. This situation was reflective of the isolation from the community in which many schools operate. Although information was available in some segments of the community, the schools needed specific development to become aware.

During the period covered by this research, several initiatives on professional development received funds from the provincial government. Unfortunately, many teachers were not allowed release time because of the Social Contract, the government's current approach to the deficit. This budgeting restraint meant that many Boards withdrew professional development activities and cut salaries, causing teachers to resist government initiatives.

(Q 3.15) Only 19 per cent of respondents' schools still provided first-year apprenticeship hours in some trade areas given the new direction for high-end technology and illustrating that the trades were being de-emphasised.

With the change in direction of the technology courses, the basic level students had fewer options as the schools implemented the new project method. The teachers knew those students who needed their support and direction because they were doing less well. Those respondents who did not adopt the new programmes still provided the trade-based courses for these students. Yet, these teachers themselves came under more pressure from the rest of their school staff.

Furthermore, the integration of subjects promoted by the initiative meant that other teachers ''raided' the technology content and taught it themselves' (Interview, 1993), thereby eliminating students from the technology courses. The teachers were advancing the interests of their student while implementing an official policy based in differing ideology and with varying support. In some instances, the interviewees observed that the students withdrew from the school as a means of indicating that the programme was not what they wanted. Withdrawals were of interest to these teachers but often an issue for which they have

little time to deal.

(#3.16) Sixty-six per cent of the respondents expressed satisfaction with the evaluation and attainment of basic level students. The attainment expectations for these students was lower. Many interviewees (1993) were of the opinion that school was a place to come to for these students because they had nothing else to do. The interviewees supported an approach to these students whereby they could learn to do some things of value for themselves and their community.

5.5.2.4 Promotion

Based on the questionnaires, the following section explains the practices of the technology directors in controlling the promotion of students. With no standardised examinations in Ontario, a wide range of practice occurs between schools. In fact, the only similarities between schools are a result of teacher training common to all Ontario teachers, their own professional network or informal networks between schools.

(Q 4.1) Most (7 per cent) student promotion was in a programme area. There was provision for partial completion of a course in some schools (35 per cent); other schools require students to pass all subjects (27 per cent) to be successful in a grade level. Twenty-three per cent of respondents' schools allowed for a reduced workload with fewer subjects taken. This difference in practice meant that outcomes for similar students in two different schools could vary: one could fail in one location and be promoted in another. This is a serious equity issue.

(Q 4.2) In addition, the students identified as having special-education needs were subject to different promotion practices than other students with similar needs, who were not identified in the same basic level class in 78 per cent of the schools. One interviewee (1993) observed that, in fact, students may be the same in terms of learning characteristics, but because of uneven practices of identification some students did not get the benefit of the special-education designation.

(Q 4.3) In Ontario, the low attaining student may be low ability in 64 per cent of the schools. If classified by diagnostic assessment, they received one of two designations: educable or trainable retarded. Both designations are for special education. What occurred in the basic level classes was that students who are low functioning according to their

attainment records (19 per cent) and not identified, gravitated to this class. Twelve per cent of the respondents considered these students to be the same. Three per cent of students were in the basic level class because of their attitude according to the respondents.

Most students with English as a second-language were placed in basic level classes. It was one reason for the introduction of a supposedly non-differentiated approach for the first year of secondary school (MET interview, 1993). On closer examination of student outcomes, in fact, these second-language students were placed in lower levels in the non-differentiated class as well (ibid.). This has confused the issues in Ontario.

(Q 4.4) No one practice (68 per cent) prevailed in the province when promotion of students was considered. The areas evaluated were practical work, skills, participation, attendance, behaviour, attitude, motivation, effort, attainment, tests of permissive or written work and ability with the results discussed at the promotion meeting in June for a decision.

With the new mastery learning approach implied in the provincial standards for establishing levels of students, no promotion will occur until the students demonstrate attainment of the outcome for a level. As for the students of interest in this research, most remain at level three, an equivalent to grade three, called the first level, or level six, the second level. The change to external examination and the level promotion practice had not had an impact on the programme or practice at secondary schools at the time of this questionnaire. The directors were in the process of planning for these students.

(Q 4.6) In Ontario, the majority of testing is in-class (83 per cent). There were both year-end (57 per cent) and term-end (70 per cent) evaluations. The total over 100 per cent indicated both were used. Although the basic level students are more suited for practical tests, according to the respondents (1992), the testing practice base was on memory and written tests. This evaluation practice provided the system with observable criteria justifying placement, but did not illustrate the capabilities of the students. The technology policy document addressed evaluation of students and programmes. The purpose of assessment was to determines that students have:

> learned the required course content; developed desirable attitudes and understanding; acquired the necessary technological skills and knowledge. (MET, 1985)

(Q 4.7) The assessment policy of continual assessment determined student progress and performance. Partial completion did receive recognition in some 70 per cent of the schools, but not the remainder. This was another instance of unequal treatment of students, which influences their opportunities for employment. Others criticised the practice since it indicated that the students had not reached the outcome level. Interviewees indicated that the practice reflected the continuous progress of students.

(Q 4.8) Areas of policy conflict were present and were, therefore, in the document. Respondents evidently made discretionary decisions based in policy that they believe supports their position. Over 81 per cent used their discretion to promote students, using their own interpretation of the policy and education theory.

(Q 4.9) The students did not necessarily have to sit an exam for promotion in some schools. While accepted practice for identified special-education students provided for alternative methods of evaluation, an overall tradition exists that requires the rest of the students sit examinations. The trade background of the teachers led them to believe sitting examinations was a requirement for trade certification. Eighty-seven per cent of the directors had the view that examinations prepared students for the requirements of the trade. In fact, though, trades allow for alternative examination methods.

(Q 4.10) The weighting of the practical and written portions of the evaluation indicated that 75 per cent of the schools vary widely in this practice as well. Again, the possibility of unequal treatment of similar students and the general perception by interviewees (1993) of systematic unfair treatment of students exists. Although there was flexibility in the policy statements, the fact that no one method or approach was used leaves the impression of disorder from school to school and between teachers. Within departments and courses in the same school practices varied as well and was another area subject to teacher discretion.

(Q 4.11) Suggestions respondents made for improvements to courses were either teacher directed or for supports to students. Smaller class size,

more teaching assistants, co-operative experiences, teaching reading and writing first, and integration of technology with mathematics and English were teacher directed. Building student confidence and motivation along with providing personal support to students were the remainder of the suggestions. No one suggestion appeared pivotal.

To conclude, the complex nature of schooling, attainment, and student certification reflected in this policy implementation and confounded by the political agendas throughout installation meant that students endured less than appropriate education.

CHAPTER 6: COMPARATIVE EVALUATION OF THE TWO POLICIES

6.1. Introduction

This comparative case study of Scotland and Ontario's policies will evaluate the relevance of technology education for low attaining and non-attaining students using Gregg's (1976) evaluative criteria (see Chapter 3). This evaluation will determine whether funding inputs and teachers' efforts are equal and fair for all ability ranges because the policies referenced all students.

The comparison of the research data, interviews and questionnaire responses examines the approaches of educators in their respective system and how they addressed the issues of the low attaining students in technical education.

6.2 Comparison of the Two Policies

Table 2 assists in the comparison the two systems by identifying the important features of each and their similarities and differences. It illustrates that the technical initiatives had similar policy beginnings by Conservative governments, in Scotland at the national level and in Ontario at the provincial level.

Each case study reveals that the government attempted to provide all students with work-related skills. The aims differ as follows: in Scotland, the policy is described as being for 'across the ability range'; in Ontario, while the policy is directed to advanced students it restated policy for the other two streams. This means that there became different emphases as has been discussed.

Table 2
Policy Comparison: Important Features in Each Country

System Parallels	Scotland	Ontario
Objective: Target population and Core Policy Principle or Value	Manage Technological Education Across the Ability Range for Skills for Work	Respond to Changing Technologies for Advanced Students and other streams
Scope	Technology Across Subjects	Technology Subjects and integration
Political Rationale	The Rising Youth Unemployment	The Changing Work Environment
Relevance	World of Work	Future Needs of the Community
Environment	Global Competition and Adverse to External Partner MSC	Global competition and Opposed to Policy's 'Broad Based' Philosophy
Options	Negotiated With MSC	Negotiated With MET Staff
Costs	£2 million Per Project Total: for Scotland £10 million ($25 million over 5 years)	Approx. $200,000 Per Secondary School Total: $60 Million (approx. £24 million over 5 years)
Sub-Issues	Practical Applications Real Problems Bridge Education to Work	Declining Enrolments Employment
Initial Support	Conservative National Government	Conservative Provincial Government
Accountability	Research	Monitoring
Timeline	Funding 1983 - 1985 Extension 1988	Funding 1989 - 1994 Extension 1985
Implementation	5 years reduced to 3	5 years extended to 10

(Adapted from policy criteria accepted by the Ontario Council of Regents, OCR Newsletter, 1995.)

Each policy includes statements that address the relevance of the skill level for all students equally. Scotland addressed technology across subjects with SCOTVEC modules and in the new subject of technology, whereas in Ontario the initiative was limited to elective technology subjects and those few integrated subjects. Unlike Scotland, Ontario's policy statement did not extend to all students.

In employability terms, in Scotland the rationale behind the policy was to address rising youth unemployment and the lack of skills for work, whereas in Ontario it was a response to the changing work environment. Both Scotland and Ontario were satisfying employer demands. Both had the opportunity to make significant changes to technical education. Neither policy directly addressed employment objectives.

The conceptual shift that occurred in Scotland among implementers included the common format of the modules and their acceptance for the National Certificate. The conceptual shift to instruction driven by projects is the predominant aspect of Ontario's introduction of the 'Broad Based Technology' guideline. The research indicates that each approach had varying success with some aspects of education.

In both locations, computer applications were in the main the new technologies introduced for use in the work world and for the practical application of learning. The improvement to schooling for youth assumed improvement in their employability because of computer skills acquired for certification. Neither policy required direct links to employment outcomes.

The response of the educators to the political direction identified by this research was to include the initiatives with in the current curriculum structures. While technology remained an optional subject in the Ontario curriculum, in Scotland technology became an additional subject discipline. The difference in the scope of change had implications for the number of students exposed to technology. In Scotland, all students receive technology instruction, whereas in Ontario only those students who choose technology as an elective benefit from the initiative.

The educational environments into which the governments announced their interest in technological education were not entirely receptive. Both governments used the changing manpower effect of the global economy on skill requirements as a rationale for introducing change. The senior educators in Scotland interpreted the initiative as an encroachment by both the central government and the MSC into their jurisdiction. Some of the resistance identified as based in education 'nationalism' resulted in the Scottish national strategy being determined within the *ACTION*

PLAN (1983) and the Standard Grade for secondary schools. Changes in assessment practice in the units of instruction of the approved modules includes externally examined criterion-referenced assessment and is agreed to by the Scottish Examination Board, were factors influencing students. Examinations now include low attaining students for certification at the foundation level; whereas, before the system had been directed mainly to the selection of about 10 percent of students designated academic (SOSB, 1991). Assignment of a standard grade is available to students at three levels rather than the former 'O' grade for examined subjects.

Some of the curriculum modules have external certification with SCOTVEC nationally. This assessment indicates that the system is attempting to improve its consideration of the low attaining students albeit outside the SED certification. Some interviewees (1993) indicated that they used modules for both systems of certification but it is unknown how widespread that practice is.

In the Ontario system, some teachers' resistance grew from their trade-based background. They questioned the relevance of the initiative from the trade perspective. While the emphasis in technology education applied to the high-end technologies, these teachers applied the various new technologies to their trade-based courses. They believed that employability of many of their students would continue to be in the trades and not in the high technologies. Rather than change the project methodology for low attaining students to learn-by-doing, the project driven form of delivering technology remains for all three groups.

Additional resistance to each initiative occurred at the level of the classroom teacher. Therefore, each education department defined their teachers' control of instruction. Maintaining control was with the delineation of the curriculum, as well as, assessment and hence, how the low attaining students can attain certification of their learning.

Within the curriculum framework, that confines them, teachers develop instruction, learning activities and prepare the students for examination and certification. The teachers in each location then determined the content relevance according to their concepts of its legitimacy in their setting. The teachers' resistance to the new curriculum was in the form of job action in Scotland and not changing

the curriculum in Ontario. Teachers in both locations finally accepted the changes after some deliberations.

The actions of the senior levels of management, the SED and the MET, limited the response to all ability groups. The limitation on options was through targeted funding to teachers for specifics: the development of modules in Scotland and the equipment renewal in Ontario. Control of these options was through the required approval process of each governing body. The Authorities or the Boards satisfied the application criteria in the justification of their staffing, learning materials development and with these strategies to the courses developed.

Select school funding in both areas, determined by the senior educators, treated schools unequally and replaced equal funding distribution. The funding inequities further introduced some unequal treatment of students with unequal access to resources not based on stated needs. In both locations, on extension, funding was not available at the level of the initial implementation.

The funding differences in each location are as follows. Scotland transferred £10 million (about $25 million) over five years to five projects, whereas Ontario transferred £24 million pounds ($60 million) to projects in individual secondary schools. Ontario capped the amount for each school at $200,000. The differences in population do not account for the sums but the strategy does. Scotland's use of funds meant that all teachers had access to the new modules and teacher in-service training through their network. Curriculum development in Ontario's schools remained with the funded school and had little or no impact on other schools. The effectiveness of these expenditures in terms of student employability is fundamental to the description of the new programmes but is unrealised because of the strategies used.

Each approach meant uneven distribution of the available funds during the initial stages of each policy. With extension, equal flat-rate funding is available in each location. Further discussion of the effectiveness of each approach is under Accountability.

Both education departments used the funding to install their approach at the school level through contracts to individual pilot projects. The level of commitment supposedly ensured by this method does not

necessarily mean endorsement of the aims of the initiatives. The curriculum presented to students as technology education at the classroom level varies in both locations. A reflection of this content variation in Scotland is in the number of modules accepted for certification under one specific description. In Ontario, each school has its own curriculum. The contracts used in each area as a method of control are not a part of ongoing curriculum implementation.

The extra personnel the Scottish funding provided established an effective network and personnel to produce learning materials. The learning materials developed in each area are a visible product or output that illustrate in one way the effectiveness of the special funding. Research on student response to the materials is available in Scotland but not in Ontario. The research did not examine a comparison of modules for effectiveness. The perspective of finding the best way of delivering the programmes to the various student groups receives little attention with the curriculum now installed.

Scotland addressed pre-testing with students in the pilots. Curriculum adjustments based on the first experiences of classroom teachers were from their comments to the teacher network. The pre-testing maintained the academic bias within the criterion-referenced assessment system. By assigning norms for each level to the materials, the traditional academic approach prevailed and other alternatives went unconsidered. The pre-testing of curriculum at best considered a level of effectiveness unlike in Ontario where little occurs.

Nevertheless, neither system, having established new curriculum, conducts ongoing evaluation or review of student outcomes. Inequity between the student groups is effected by means of the student assessments.

One critical difference in the curriculum developed is that in Scotland the modules, considered practical by both teachers and the SCOTVEC through pre-testing in the classroom, were for national adoption. The modules present real problems and are the bridges to work. The definition of these aspects of the modules is inherent to their acceptance for certification. The widespread application of curriculum contrasts with the Ontario practice. In Ontario, the curriculum framework had a central development as the 'Broad Based Technology'

without widespread teacher support. Each Board developed its own curriculum from this framework. The curriculum was not for use outside the local Board area, which developed the units of instruction unless there was a purchase agreement.

In addition, in Ontario, commercial curriculum became available for the Boards to purchase as part of their approach to the higher-end technologies. This meant the inequalities in the curriculum provided have wider variation in Ontario than in Scotland.

The individual classroom-based assessment of learning in Ontario is a greater contribution to the inequalities as each teacher designs his or her examination from their school curriculum.

As to the availability of modules in Scotland, Croxford et al. (1991) indicated that there were over 2,000 modules developed as a result of the MSC funding the TVEI. Fewer than 10 at the time of this research were for the low attaining students. The implementation plan for the SED foundation courses was to have 17 available and to begin certification in 1989 (SED, 1982). Other avenues using modules for certification were on-the-job, at Further Education and on Youth Training Schemes if they left school.

In comparison the low attaining students in Ontario have more limited options than in Scotland.

Originally, the MSC descriptors were for its programmes beyond secondary schools; some schools used them with non-advanced courses to some low attaining students. The selection of students for this level of a module is a reflection of student interests, availability of courses and perceptions of ability as determined by the teachers.

Similar logistics influence student access to curriculum in Ontario. Not all curricula are accessible to all students because of the local situation. Therefore, some students cannot access material already developed because of the school they attend. This means that the opportunity to benefit from what is developed becomes distributed not only unequally between the three levels of students, but also unequally within the levels. The implications for the assessment of students in a fair way given the unequal access to curriculum means that student

evaluation reflects specific schools and is diverse. The evaluation of attainments or links to employability with certification is not an aspect of the Ontario implementation given these circumstances.

We have seen two forms of support for technology education in each area. The first provided by each government defining the direction of educational change. While the government for Scotland defined the direction, the Local Authorities and the schools' TVEI teachers have a limited role in interpreting their direction while the SED had a main role in both the MSC's initiative and their own. While the relationship of these levels of government remained stable in Scotland during the time of this research, in Ontario, there were four changes of provincial government. Local Boards and teachers experienced changes in direction during implementation from the curriculum to teacher qualifications, and to funding. Each case study revealed the somewhat confusing effect the central control had at the local level.

The second level of support given in each area was funding. The importance of the application for funds was illustrated by each area reinterpreting the aims. Scotland's option, to fund the creation of new curriculum by teachers and to install it through their network, meant that they accomplished teacher training for extension. Ontario, on the other hand, established a curriculum committee and extended the curriculum without teacher in-service training and school level support. The expenditure of funds for high-end computer equipment in Ontario was questionable in contrast to Scotland's use of funding. All teachers in Scotland eventually profited from funding, whereas in Ontario only individual teachers benefited. Therefore, the expenditure of public dollars had a wider effect in Scotland.

The question of what is the benefit to the low attaining students derived from the technology courses in secondary schools is difficult to qualify. How would we measure benefit? Would all students be eligible to take technology as in the Scottish approach where the subject with extension is required for all students? Could technology be an aspect that all disciplines consider in its various applications on the one hand, which is another approach tried during the technology pilots in Scotland? On the other hand, would the emphasis be on upgrading school curriculum, as both Scotland and Ontario attempted? Alternatively, should the emphasis be on newer equipment, on which Ontario focused and

on which Scotland attempted to increase? What are the measures for the level of teacher skills? How much did they accomplish? To all of the above questions regarding benefit, there could be some qualified 'yes' responses. Nevertheless, regarding student attainments: 'How were they measured and certified?' Did they increase? We saw that Croxford et al. (1991) indicates for Scotland completions improved; whereas, no such data was available in Ontario. Neither location addressed the employment questions.

Accountability questions asked about the changes to technology education in Scotland were through some of the evaluations. No evaluations were conducted in Ontario but the funding was monitored. Paterson's evaluation for example said that some of the variation of the benefits of the TVEI in attainment was the result of the increases in attempts at examinations (Interview, 1991; paper undated and unpublished). Some projects had more students staying on. As all projects were different, he states that the results appeared confounded as sometimes non-TVEI students benefited more than TVEI students did. These results increase inequalities.

Other Scottish changes, such as measuring attainment by criterion-referenced assessments, further confound the results since the basis of assessments changed. With the continuation of the practice of using percentages applied to the criterion-referenced results to define ability groups, the assessments reinforced existing inequities. At the same time the funding and attention increased the inequalities for those not part of the original funding (ibid.). Future research may explain how some schools achieved better results.

No research of technology education of this nature exists in Ontario. In contrast to Scotland's research base, Ontario's research is focused on students' characteristics to identify their educational needs. Both systems are interested in holding on to students in order to maintain enrolments for funding, to increase certification and thus to increase employability.

In Ontario, accountability planned for 1995 consisted of a monitoring process. Monitoring was to include course enrolments but not attainments or the student outcomes to the extent of that which Paterson's (ibid.) research provided for Scotland.

The planned monitoring emphasis was on the contractual process. The unsuccessful applicants and those schools not implementing the curriculum received no attention, thereby establishing a further basis for unequal treatment of student groups. The policy document provided a mixed message to Ontario schools in that the funding of high-end technology equipment followed the direction to attend to the advanced students

The short timelines influenced school level installation. The extension of the subject in both systems proceeded from the funded pilot projects without full evaluation. During the time of this research, the SED (1991) reported no significant changes in student enrolment. The observed increase in secondary school enrolments (ibid.) over 10 years was a trend resulting from changes in assessment policy. Some TVEI personnel (1993) attributed this change to the lack of employment opportunities and to the possibility that now exists for full classes of students taking the SCOTVEC modules as this certification becomes more acceptable and available in secondary schools.

The low acceptability of the SCOTVEC certification by the employers and the wider community remains an issue not yet resolved. 'SCOTVEC wasn't ever accepted by the employers...' was the opinion expressed by a TVEI staff member (1996) who attempted to make-work placements. The wider employment environment continues to maintain lower levels of unskilled jobs; therefor, new alternatives to include this group of students in the community need development.

For Ontario, because the possibility of linkages exists for other levels of students, implementation did not consider employment strategies. Further, timelines in each area did not allow for consideration of student self-sufficiency, given the current prospects for employment in troubled economies. Employment for these students remains an unconsidered policy matter in both locales. Neither Scotland nor Ontario employers have a history of employer funded training.

Discussion of employment beyond Youth Training schemes in plans such as 'workfare' was not evident. Acceptance of high rates of unemployment, condemnation of those on public assistance and lack of consideration regarding the opportunities afforded the low attaining students

characterise each system (TVEI and Ontario schools interviews, 1993).

Yet, each education system had the mandate to establish links to employers. Some schools had effective programmes (Scotland and Ontario teachers' interviews, 1993; Questionnaire, 1993) that provided students with skills and, in some instances, jobs on school leaving. To address the lack of employment and placements requires wider discussion, planning and effort.

The TVEI interviewees (1993) in schools have some experience with developing work experience placements, and their view of the communities' responses to low attaining students varied with the response of the community. These are some of their comments:

> This employer provided a placement and he's providing a lunch for the whole class when they finish this module (Scotland, 1993).
>
> We had a bad experience with that placement and they won't take another student: it ruined the opportunity for other students (Ontario, 1993).
>
> They [employers] don't have the time. They don't want to take the time. They don't know how to make it useful for the students and themselves (Ontario, 1993).

Some schools developed in-school placements to deal with local issues and to expand their courses, which became an innovative practice. Some secondary students assist with the special needs students, which is mutually beneficial.

In both areas, the short timelines meant neglect of the core policy directing the education curriculum to provide for the total range of students with technical skills. Teachers' interest focused on the relevance overall of technology and not on equity for low attaining students. This research found that not all students are treated equally in terms of availability of modules or subject options, nor is there equal opportunity to benefit from technology education.

When discussing low attaining students, teachers in both locations expressed interest in the certification approaches in other education systems for these students (Interviews, Scotland and Ontario, 1993). Both systems examined moved away from ensuring attainment across the ability range by focusing attention on less critical curriculum indicators, such as materials and enrolments. The timeline did not allow

for issues regarding low attaining students to be resolved.

The government personnel (The SED and the MET) defined the strategy for their implementation; the critical difference between the two education systems was the strategic approach. In Scotland, all students with extension receive some technology skills assumed to increase employability and equity. In Ontario, resistance to the optional curriculum continues at the school level.

Both internal and external issues drove technology education in each country. The senior personnel interviewed (1991) all agreed on the importance of including technology beyond the single subject area of computer studies to a wider range of subjects. Curriculum development in the high end of technology courses and the provision of resources to the classrooms for the curriculum were implementation issues, which required teacher in-service.

How senior personnel controlled curriculum content in part through the in-service training at the school level differs. In Scotland, we saw control through the TVEI designation of teachers within the entire network. In Ontario, direct involvement in writing the curriculum framework by MET with Boards' teachers both centralises and decentralises the influence of the MET. The presence of each government department through the approval process meant that the initiative was somewhat controlled by them. The school level teachers develop the content within the constraints controlled by the SED or the MET. In Scotland, the curriculum scope and sequence sharing occurred after experience in order to receive the improvements made by the network. There is no such strategy in Ontario; each school develops its own approach, which from several perspectives, already discussed, was not effective.

In addition, matters of organisational relationships with the Authorities or the Boards required ongoing deliberations to resolve issues of autonomy and control, professional education issues and local political issues. Funding shortfalls in both areas were a continuing concern in both areas to maintain the direction of the curriculum changes. Additional support planned by MET was not forthcoming and teachers expressed (1993) the view that they are 'on their own' if the Board administration was not supportive. Ontario teachers felt they were

competing for students, unlike in Scotland where the decision to incorporate technology into every student's timetable eliminated the necessity for teachers to compete.

The technology teachers interviewed consider that focusing on attainments for this group of students does not reflect accurately on several issues. In Scotland, it appeared to be happenstance that SCOTVEC provides certification to students of interest. The previously informal practice to use SCOTVEC descriptors for non-advanced courses became a system-wide practice that influenced the Standard Grade and technology as a discipline. For Ontario, the partial apprenticeships provided are not available to the same extent for any group given the new programmes, thereby, removing an avenue to employment from secondary school and increasing the inequalities between groups of students.

In Scotland, teachers did not make a conceptual shift around student ability based on their capabilities. Offsetting any practical examination of technology are written norm-referenced examinations. Because they were new forms of assessment, this first subject application of these examinations appeared more significant than the technology initiative to most TVEI teachers (1993). This assessment approach means that their teaching was more oriented to mastery learning or attainment of standards in subjects. Because of the initiative in Ontario some teachers became more entrenched in their trade-focused curriculum for basic level students and did not pursue other possibilities.

The secondary school careers weeks, days where students could visit places of work as a field trip, and trade fairs in schools were part of traditional teaching methods in Scotland. With TVEI, work experience appeared as a new approach required by the MSC, which allows students to meet and talk to people representing work areas. The availability of these experiences depended on the efforts of teachers in a school, but now the practice is limited to one week.

One supervisory administrator (1991) in Scotland addressed directly the national planning of employment outcomes on behalf of low attaining students. Practical skills for work were offered these students but they were not recognised by employers. Neglect to attend to low attaining students to a great extent was attributed the interest of special

purpose bodies in the higher attaining students (TVEI Interviews, 1991, 1992). This interest was similar to the practice of Ontario educators who did not address low attaining students because of the policy focus emphasising advanced students. One conclusion is that this is part of the education culture.

Offsetting the practical assessment provided in class to demonstrate work skills in Scotland, was the external form of assessment based on written tests. For Ontario, a similar inconsistency in understanding the strengths of these students exists. The comparison of related issues follows with a more extensive examination at the school level in the next section.

6.3. Comparative Analysis

This section compares first the interpretation of the objectives by the policy implementers followed by the interpretation of the policy into practices at the school level to identify how students are considered. The four functions of teachers reflect the practices used in the technology initiatives. Changes examined are those changes in functions that relate to the low attaining and non-attaining students.

Generally, each case study indicated that the teachers did not extensively consider these students in their implementation due to the rapid extension (Scotland and Ontario schoolteacher interviews, 1992, 1993). Few questionnaire respondents in each area reported the attainments of their school for the students of interest to this research for similar reasons given in the interviews (1993). Both revealed that teachers did not wish to have attainments examined as a reflection of teaching.

It was the opinion of the teachers interviewed in both areas that focusing on attainments for this group of students does not reflect accurately on several issues. According to them, to understand attainments fully an understanding of the structures and functions of schools is required to know what is possible with policy implementation.

6.3.1 Comparison of System-Wide Considerations

The structures providing technology to low attaining students in each system have different implications. For Scotland, happenstance provided the use of SCOTVEC recognition as one innovation. For Ontario, that form

of partial apprenticeships are not available to all students. The unregulated trades and employer-specific apprenticeships remain underdeveloped.

Public information (CTV, 2000+, 1991) sources indicated that then over half of the employed used computers. Not having all students learn some basic technological skills, here meaning computer skills, hampers their futures. The teachers interpreting the aims within their current academic curriculum structure effectively deflected the intention of the initiatives at the expense of some students' opportunities and the direction established by the central governments. As noted, resistance to the new technological 'vocationalism' by the teachers of secondary schools, especially in Ontario, was for structural reasons. Evaluating student needs related to employment was not at the forefront in either location.

The high-attaining students in each location represented the best of teaching outcomes because their attainment assumes they demonstrate a success on the part of teachers. As the remaining students participate at times in classes with the high-achieving students, the class atmosphere, in the opinion of Scottish respondents (1993), also benefited those students.

Although the activities in the class were known to be beyond the functioning level of some the less able students, this concern was not raised in the planning function by most of the Scottish teachers interviewed (1993) at any level. Counselling students not to sit exams or to leave school (TVEI interviews 1993) is the accepted culture of the Scottish schools. Therefore, most planning efforts are not on behalf of the less able student.

There is no evidence of conceptual recognition of the capabilities of low attaining students, as a group, having similar learning needs as some special-needs identified students. All Scottish teachers consistently indicated (1993) that they do not differentiate students, thinking therefore that treatment of all students are thereby equal. The external examinations differentiate not the schools. After examinations, schools were able to differentiate formally when they provided students with the new curriculum. Reluctance to acknowledge, before the examinations, the fact that the classroom groupings do differentiate,

although 'it is not called that' (Interviews, 1993), was evident. The Ontario teachers acknowledged they do differentiate even in classes of basic level or low attaining and low ability students because it is necessary to plan the curriculum.

For Scotland, given the new curriculum for foundation students, the specific planning for the variety of low attaining students as groups was unclear. In Ontario, while there was recognition of the low attaining students through the streaming process, but the new curriculum had little relation to the areas of their possible employment. Furthermore, the focus of the curriculum on the advanced students meant little planning occurred for the various types of basic students at the school level due to time constraints.

The planning for work placements in the community added to teachers' duties. Meeting with employers was a new role for most of them. The success of this part of the planning according to the TVEI teachers (1993) related to the local economy; there were fewer placements for the low attaining students. In part, this was due to the additional time it takes to prepare them for a placement, and the willingness of employers to spend time orienting these students to the workplace. For example, one student who was pumping gas was dissatisfied with the placement and the cleaning duties that went with it therefore another placement was made. This type of student response made the planning more difficult when students did not want to fulfil their placements.

Ontario's longer history with work placements meant that no development of this area of the curriculum occurred. The failure of the curriculum to address the issue of work-related skills for employment purposes meant that students remain unprepared to enter the community.

6.3.1.1 Teacher In-Service Training

The original planning in Scotland focused on the generic format for the modules, including their evaluation and reception by the students at each level. Sharing of this information was in the network when other teachers were oriented to the modules. All the TVEI teachers, unlike Ontario, were part of the implementation network. The SED network formalised through meetings, focused on curriculum development and training, to a lesser extent. Both initiatives funded these meetings. The selection process of the pilot projects meant that no single or

specific technology discipline captured the funding. The network model extended the in-service training beyond the single funded school.

The use of this network entailed forming an approved response to technology to which all members subscribed. With programme extension without extensive funding, the local schools in Scotland have equal access to the materials through schoolteachers contacted through the network. This is unlike Ontario where there was no materials or training provided.

In Ontario, the application process became the planning and training mechanism though the Board-wide planning for the technology curriculum, which the schools then adapted. Those Boards that had senior technology consultants assisted teachers with their application but at the school level, teachers received little or no training. Some teachers could attend an annual conference of their choice, approved by senior administrators. Most teachers negotiated training with their new equipment, which was normally free from the supplier. Therefore, new directions for teaching methodology were not well developed or planned. Seven teachers on interview (1993) indicated that they were self-taught and beginning projects with students on a trial-and-error basis. The classroom curriculum remained undocumented and lacks pre-testing across the province. Keen students, usually the more affluent with high-end computers at home, in some cases taught the use of new computer equipment to their teachers.

The planning for up-grading classroom teachers skills (1993) was almost non-existent and the new qualifications required became an individual responsibility. Those teachers' planning for school adoption of the new programmes and without new qualifications relied on their informal contacts outside their Board on a subject basis.

The planning strategy in Scotland built in cohesion with peer training among the school-level teachers, whereas the Ontario approach created disunity with teachers competing for students. The position of technology was enhanced and more legitimate in Scotland due to its acceptance as a required subject discipline. Attempting to integrate technology with other subjects in Ontario created in-service training issues between teachers about the content of the curriculum. Overall, in-service training at the school level was secondary to the role of

teaching.

6.3.1.2 Curriculum Limitations

In Scotland, the basis for the range of flexibility in defining student programmes was on the required timetable and availability of space, consultation with the parents and negotiation with teachers to include modules for some students. One teacher described the pressure in schools to provide appropriate curriculum to these students in this way:

> ...no one bothers - pupils are put into slots. It is more important to have them in a slot.
> (Scotland Questionnaire, 1993).

For Ontario, a somewhat similar situation occurred, but for different reasons. Since the streamed class was to provide the needed level of curriculum for these low attaining students, no special planning occurred at the provincial level for them. The policy states:

> ...technological studies courses, which may be offered at three levels of difficulty...
> Where courses are not authorized at a particular level of difficulty, it is possible to submit a request for approval of a non-guideline course at that level of difficulty. (MET, 1985)

Since the definition of basic level students (Appendix C) was part of the curriculum guideline statement provided to the teachers, it was left to the local Boards to develop their curriculum and then for the schools to decide what they could provide in each subject area for each grade and level. The Board-wide and school committees determined what was offered to students. At the school level, the Board curriculum was outlined and the classroom teachers had the role of modifying the material. Most teachers in Ontario (1992) said in relation to the initiative that the equipment funds made available to deliver the curriculum were for the whole programme, the mainstream and not for one group specifically.

Some of the equipment purchased was beyond the capacity of the basic level student (Interviews, 1993), as it required higher-level reading skills than these students would have, which was generally thought to be below grade 5. Although there was the argument that students at any level can use a computer, the allocation of scarce computer resources resulted in these low attaining students not having equal access (ibid.) in some schools. Some teachers, therefore, considered the initiative not

directed to the basic level students, in some cases although the document restated the Ministry policy regarding each student level. The variety of opinions regarding the circumstances of low attaining students reflects the diversity in the local school curriculum. No one curriculum is in place for these students.

Both education systems developed ways of managing the low attaining student in a structure of curriculum differentiation. Each policy provided the rationale for the alternative curriculum and the certification of alternatives on the completion of secondary schooling. The certification identified the level of attainment and has a variety of meanings in the communities into which these students graduate. Given a good school relationship with the employers, work placements eventually resulted in a job for some low attaining students. In communities with high rates of unemployment, there was unlikely to be acceptance of the certification of these students (Raffe, 1988; SED, 1989; Ontario Interviews, 1993). Neither area systematically developed the community awareness of these low attaining students through its mandate with industry. Many teachers in both locations expressed the view that this development was beyond their jurisdiction.

Students who were not having success in the current curriculum were a normal occurrence in every classroom in both systems (Interviews and site visits, 1992,93). The flexibility of the programme normally allowed the teachers to revise and make an adaptation to the programme to accommodate the learning pattern of these students. Unless the student received formal special-needs identification by the system, the attention to learning needs diminished in large classes and groupings, as may be seen in the following:

> I don't have time to get to every student in each class. (Ontario, 1993)
>
> Each class has its own demands...there are always two or three students who require most of your time, meanwhile the rest of the class has to be given their instruction. (Scotland, 1993)

The bias works against the desired level playing field for all types of students because the needs of the majority come first. In both systems, most teachers' efforts with these students had to do with resolving behaviour issues or timetabling (coursing) which the following excerpts illustrate:

> My day is given over to solving behaviour problems...(Ontario, 1992)
>
> There are always the few in the class that take up time from the rest of the class. (Scotland, 1993)

What did consume the programming efforts in Ontario was individual IPRC [special education] meetings, school-wide meetings and meetings with external community placement groups. At the school level, head teachers indicated 'there was not enough resourcing to this [low attaining] group' and the opinion expressed was that 'school is not a suitable placement for some of this population' (Interviews, 1993).

It is of note that schools in Ontario accept the total school-age population and that some of the students are severely disabled.

In general then, for the two education systems, curriculum change on behalf of the low attaining students in each initiative varied in its effectiveness. Each area did certify its curriculum to these students. The meaning of certification diminished because of the interest directed toward the higher attaining students and the reinforcement of this bias by each society's emphasis on the performance of the education system measured in relation to the higher attaining students.

The lack of advocacy on behalf of low attaining students in each system was evident in this research. The role of the educators was in the formulation of implementation and limited by the SED or MET; teachers were limited to curriculum development. Teachers said that neglect to attend to all students equally occurred in part due to system constraints, but in part because the certification must have meaning and not identify the students as low attaining. The employers required evidence of these students' capabilities; this included the then new vocational form of certification in Scotland: SCOTVEC.

Problems with the curriculum meant in both areas students questioned their designation or programme and met with a wide range of responses from teachers. Scotland's teachers tended not to favour students questioning authority; Ontario's teachers tended to allow this. Given the adolescent stage of development, some advocates suggested designation meetings as a positive opportunity for students to learn how to interact with the formal institution.

Of those in Scotland who wished to comment on the grounds of appeal, the different orientations expressed on the questionnaires (1992) were:

> Pupils are given a statement saying that their likely performance and expectation will be at either Credit/General or General/Foundation. In Technical Education pupils are not set. They are taught in single mixed ability groups. All pupils are generally set the same task in relation to his ability (Scotland TVEI teacher, 1993).
>
> Practically all our pupils will be presented at 2 levels: foundation pupils will also be presented at General level unless: (1) they don't want to, (2) completely unsuitable because of SEN - but the choice will be the pupil's and any request would be given the option of dual presentation (ibid.).

The variation in the Ontario practice was as follows:

> …parents always have the final say regarding assessment of their child and may reject any finding or recommendation (Ontario, 1993).
>
> …if "basic" is not wanted they can simply decline also, [they] can choose basic if wanted (Ontario, 1993)

The new technology, computers, was the innovation that did not benefit to as great an extent the low attaining student as the rest of the students (Interviews, 1993). The use of self-evaluation and evaluation of projects by students in Scotland were new to the usual teacher-student relationship. With enhanced budgets, the selected schools introduced competition between schools. The reaction to this approach created conflict among the different political sectors of the school due to this inequity, therefore offsetting the cohesion built into the network. The programme concept did partially achieve the aim of reaching across the ability group (SOSB data, 1991).

In Ontario, the initial conception was internal to the Ministry and distinctively changed the direction of technological courses. The changes were proactive (Downey, 1988) and senior level administrators (1991) thought not understood by the school level teachers. Some of the trade-based teachers (1992, 1993) indicated that the technology structure was a strategy to eliminate their departments, with declining enrolments, in favour of the applied sciences or mathematics teachers. The administrators interviewed (op. cit.) indicated that they had no interest in the staffing configuration of schools as these were a responsibility of the Boards. The separation of responsibilities of the MET staff into a separate teams, one responsible for curriculum

development and another responsible for its implementation, meant that staff cohesion was not inherent in the organisation. This policy was a province-wide mandated top-down change, and therefore the policy had a poor reception at the school level. Unlike Ontario, Scotland's network provided the teachers with professional development alongside the curriculum development, another method of building cohesion.

While some evolutionary planning took place with curriculum, the programmes first funded took on an exemplary aura. In actual practice, often this aura was not due to programme changes but, in Ontario, to funding upgraded equipment in trade-based programmes; for instance, CAD. While the approval process for funds appeared to indicate what is best practice, a gap between the application and the programme may occur without penalty to the school or the Board.

The instances of integrating top-down policy in both areas with bottom-up local programmes did occur in schools and areas where there were strong school and industry links. Schools where students could have work placements with industry, and in the senior grades work with professional industry staffs, successfully implemented the policy (Interviews, 1992, 1993). As those relationships appeared geographic or school-community based (parents of students in some cases), other schools did not have access to the same opportunities.

In practice, what was to be a broadening of opportunity limited some students to local industry and may narrow their work experience. At the same time, these students had an advantage of that experience over other students and the opportunity to make contacts for future work. This approach introduced inequalities according to those technology directors (1993) whose placements other local schools took.

6.3.1.3 The Structure of Differentiation: Mixed-Ability Groups

The largest recognised way of introducing inequalities in education was through programme differentiation. The one dimension that originally appeared on the surface to distinguish the Scotland education system from the Ontario system, was the concept of differentiation of students on perceived ability, formed within the belief of teachers and reflected in assessment procedures. Here the focus is on the interpretation that classroom practice provided as it influenced the quality of the curriculum received by students. Teachers perceptions surrounding

ability indicated the level of certification the students may pursue.

In Scotland, mixed-ability classes were the predominant classroom model. The reporting of most student attainments was in this grouping (SED, 1991). After examination, these mixed-ability classes are reorganised. With the new designations of foundation, general and credit following the acceptance of the assessment model of Dunning (1977), the classes could be designated as mixed-ability, foundation-general and general-credit in schools during the period of this research.

In Ontario, at the secondary school level at the time of this research, students were in classes of separate ability groups; these classes are basic, general or advanced.

During the interviews, before and after completion of the Scottish questionnaire (1992), discussion focused on the informal practice of 'setting' classes. The educators interviewed indicated that 'setting' mixed-ability group classes, the dominant model, was the practice in schools. This setting was different from that of the special-needs 'set' classes and the students may or may not be special-needs students. The students were in a class based on ability if the number of students in the school allowed for more than one class for that subject and grade level. Setting according to the interviewees occurred before the official designation by examination in all classes simply by teachers grouping students. Most classes usually had three groups: high, medium and low. The schools identified the students who were likely to attain foundation or low general, and placed them in one class.

Again based on the school size, the classes then would be set to have all foundation, all general and all credit-attaining students. The other classes then would be the high general and the high credit-attaining students. This practice effectively mirrored the Ontario classrooms, but in a different conceptual orientation of policy which had claimed not to differentiate students before examinations. After the policy was changed, students were placed in classes by attainments or ability and received the curriculum based on the certification that the student was attempting.

At the time of the initial interviews (1991), the practice of providing the SCOTVEC courses to the foundation attaining students was in effect.

When this practice became more widespread, more courses became available and after the extension of technology in Scotland, the possibility arose for entire classes to be in SCOTVEC modules and for recognition with the National Certificate.

In both systems, the range of classes depended on school numbers. The availability of places in a selected class depended not only on enrolment numbers, but also on teacher qualifications and the coursing plan that has some courses on the timetable placed in opposition to other courses. These were the realities that intruded on the ideals of policy.

The difficulty in identifying the students of interest occurred because those students who are in the low attaining group in mixed-ability age-based classes may not be identified like the students with learning difficulties and during this research the practice was changing in Scotland to have streamed subjects.

In Ontario, too, there were multi-level classes because of low enrolments. Differentiation of Ontario students was by ability into one of the three streams. This usually meant that, in smaller schools, within grade levels often there were not enough students in each ability group, the effect of which was to construct a class with different ability streams and grade levels. This meant that there were similar classroom configurations given the different conceptual frameworks that had an impact on students. Again, it is of note that these accommodations occurred where the numbers of students warranted an adjustment and there was agreement by the school administration.

In both systems, in the largest schools, the different ability populations were in segregated classes to make the planning of the curriculum easier for teachers, according to the interviewees (1992, 1993). For students at the margin of any group, particularly in Ontario, this practice limited their opportunities to attain a higher level. Scotland offsets this with the provision that allows a student to take examinations at two levels.

6.4. Comparison of the Functions of Technology Schoolteachers

Comparison will now be made of the teacher functions in each location at the school level to examine the circumstances of the low attaining

students.

6.4.1 Planning in the Schools

The official statements in each system indicated that provision of an equal opportunity for technology education was for all groups. We saw the grouping practised in elementary schools and in the early years of secondary schools began the process of providing schooling in a differentiated style. Although in Scotland during most of the 1980s identification was not as less able, or attaining less in secondary class before examination. The teachers initiated individual curriculum adjustment. In the late eighties, differentiation was introduced through Standard Grade and the curriculum was pre-tested for its use with the low attaining students at what was now called the foundation level and was certified.

In Ontario, teachers were aware of the students that were low attaining on their entry to the first year of secondary school. The streamed placement of these students provided an altered curriculum for the whole class to encourage success and, it was hoped, certification on the completion of secondary school. Within the class, teachers made further individual adjustments. This resulted in a formal acknowledgement, if the student and parents agreed, of the achievement level. Further curriculum adaptation that was possible, may not be considered appropriate by some teachers based on their concept of a minimum standard.

The result of 'set' mixed-ability groups in Scotland appeared similar to the multi-level class in Ontario in terms of the learning characteristics of students. Students who were not reaching their potential had similar profiles, in the view of the educators (1993). Not doing the work was foremost (see Table 3). Why a student does not do the work in respondents' opinion was due to basic communication problems along with attitude. Table 4 illustrates the role of ability separate from attitude. The teachers interviewed in Scotland (1993) indicated that the new approaches used are easier for planning and responding to learning needs. In Ontario, the teachers' conclusions were that the project-based approach of the curriculum was not suitable for the students in the low attaining class because of their learning style and their need for teacher direction although it made planning easier.

approaches used were easier for planning and responding to learning needs. In Ontario, the teachers' conclusions were that the project-based approach of the curriculum was not suitable for the students in the low attaining class because of their learning style and of their need for teacher direction although it made planning easier.

The questionnaire explored the beliefs of teachers in relation to underachieving, illustrated in Table 3 following:

Table 3
Teachers' Views on Causes of Underachieving, by Country

REASON	Scotland	Ontario
Total responses*	N= 43	N= 47
not doing work	25	19
Communication: • listening	17	15
• oral	5	7
• reading	10	19
• writing	15	15
Tests incomplete	3	3
Legitimate absence	7	4
Truancy	12	14
Part-time employment	4	11
Attitude	21	15
Confidence	14	9
Peers	18	8
Outside interests	11	7

*Based on multiple answers from each respondent

J. Oakes (1992) research on American grouping by ability makes the following points. She observed that fewer resources, less qualified teachers and lower-level information were provided for less able students. She argues that the need to track or stream these students is important for ensuring that this unequal provision does not continue in the public systems.

The impact of the mixed-ability groups in classrooms meant that the

specific target population of this research was difficult to identify. At the time in Scotland, the attainments at the end of the school term indicated the number of students with successful modules and courses for each class. The enrolments compared to the completions did indicate the number of students who had no attainment in the national statistics; for example, the SED, 1991. The school and the central government knew the early school leavers, indicating the total cohort school experience.

While this information, available in Scotland but not in Ontario, may have improved planning, lack of attention continued as the systemic interests and values continued to focus on the academic students, and in relation to technology, those most employable. This selected interest added to the inequity affecting other students. As noted earlier, the conceptualisation of the curriculum was seminal to differentiation.

The classroom teachers had the practical experience of managing the complexity of sorting students, which in part relies on their judgement. The literature reviewed has outlined this complexity by describing the ability levels in the student population that interact primarily with adolescent cognitive development and cognitive style. The school programme and these characteristics have repercussions.

The method practised by the teacher facilitates attainment, but that in turn sways the teachers' view of what is appropriate for particular students. The use of ranking after a student has attained a skill can influence the level at which a student may take a course. At the end of secondary school, students were not considered prepared to be self-sufficient. While Scotland had introduced the Youth Training Scheme to compensate for this deficiency in 1983, Ontario had no programme plan.

This research examined the basis for the programme selection in planning for students at the school level. In both countries, policy determined curriculum for the foundation and the basic level students. Influencing the school planning for student timetables were a variety of factors. In Scotland, the respondents (1993) identified ability frequently as a factor in their decisions. Availability of a course and career ambition was the next most frequently mentioned factors. In Ontario while attitude was a factor, there appeared to be communication problems that required consideration in planning courses.

Generally, the philosophy of the criterion-referenced assessment adopted is that students either attain the criteria or not. The selection of the criteria is one matter we have discussed. At the time of this research, emphasising criterion referencing was not apparent in the examination results due to the ranked definition of specific attainment populations.

The way Scotland implemented its approach applied grade and age norms to test items, some of which teachers submitted to the examination board. The application of norms to the student responses categorised the students into attainment levels. This relation to norms effectively offset the basis of criterion-referenced assessment. The use of these statistical methods obscured the national approach to use criteria and the issue of student capability is lost.

In contrast, Ontario uses no external examination and, therefore, no data is available resulting in more questions about the fairness of using individual classroom assessments. Criteria were not defined across the system.

In Ontario, the conceptualisation regarding student capabilities was not a new factor in technical education. Given the approaches to technology, and other subjects, a similar belief system appeared in both locations among teachers in relation to students. While Ontario teachers related underachieving to concepts of effort, they considered the students capable of achieving more if they did the work. This appears logical given the streaming.

In Scotland, not doing the work and attitude appeared as the main factors for underachieving. Also, peer pressure, listening, writing and confidence all contributed to non-achievement whereas, in Ontario, not doing the work was a critical factor. Added to this was reading ability. Attitude and listening were also important contributors to under-achievement.

The issue of multiple interacting causes of student low attainment appeared to be daunting at first glance. Because conceptualisation is fundamental to the planning for and management of these students, it is critical to keep in mind other jurisdictions have success with these students.

Two questions explored the perspectives of the respondents with regard to these students and their low attainment. The most influential causes of low attainment, according to teachers in each country, were attitude and ability, with attendance being a third related factor (see Table 4). Without further student assessments, the relationship between the two main factors cannot be determined. Is attitude a result of inappropriate curriculum demands? Does perceived ability result in appropriate curriculum? The inappropriateness of the curriculum for low attaining students, results in their belief that school has no benefit for them and, therefore, they do not come, has been documented by Raffe in Scotland (1984, 1988). The important consideration is the type of opportunity afforded these students following the curriculum restructuring.

Table 4
Scotland's and Ontario's Teachers' Beliefs on the Most Influential Cause of Low Attainment

	Scotland	Ontario
Total responses	N = 39	N = 38
Absence	10	8
Attitude	16	15
Ability	13	15

The view teachers have of low attaining students was based in the number of problems with which some of these students are dealing (ibid.) namely:

Attitude to school due to unsuccessful years
Poor home life
Poor nutrition

The lists of suggestions made for planning by the respondents to provide support to these students contained components of an approach that raises expectations, an important factor according to Rutter et al. (1979). The lists reflect, though, that the respondents did not appear to be aware of the experiences with similar students in other areas or of the relevant research to increase the success of the low attaining students.

To deal with such gaps in information, one of the recent recommendations of an Ontario Royal Commission on Learning (1995) suggests that teachers have ongoing professional development to maintain their licence. Fullan (1992) suggests offsetting resistance to change at the classroom level

by providing information to the teachers of the alternatives and the advantages for students of different approaches. An additional advantage of planning curriculum differently would be the diminishing of student behaviour problems, which was an issue in each system. If the planning initially incorporated an approach of continual programme improvement by teachers a focus on student needs could have been introduced (Bell et al, 1988; Fullan, 1992)

6.4.2 Comparison of Schools' Polices

As previously mentioned the efforts of the government policy makers were in controlling the policy. Therefore, when the need for school policies or procedures were required in the planning stage, the focus was on incorporating the initiatives into the current cultures. Not identified in the policies of the schools were changes to the cultures or anticipation of how new technologies (computers) alter schooling. Senior teachers nearing the end of their careers had few current technological skills. The main concern of Scottish schoolteachers (Interviews, 1991) was to deflect outside intrusion. The Ontario schoolteachers were not supportive of making the changes given the current policy. Yet, these changes were contentious in both locations because of teachers' attitudes as we have seen in each case study.

In Ontario, at the school level, since the subjects in technology already existed, there were no new policy requirements. The direction to amalgamate was internal to the subject, or discipline content and process, and required no new school policies or procedures. Only related health and safety practices as a requirement of courses needed reviewing with the introduction of new equipment and training of students.

In Scotland, the extension of technology as a subject across schools had an impact on all subjects and in some schools requires timetable changes. Work experience involved additional policy and procedures at the school level to be successful. The increased contact with local businesses meant more issues around student expectations required resolution by the teachers. Setting this in place was time-consuming, and teachers welcomed the additional staffing to make the changes.

Introduction of the demands for schools to publish examination results added stress into the school environment along with the technology initiative. Teachers expressed concern on the questionnaire and in

interviews about the disruptive external pressures felt at the school level.

Scotland's school policy was most evident in the defined role of the co-ordinator whereas, in Ontario, the qualification of the technology department head takes precedence.

The least important area of policy according to the responses in both locations (Q 2.1, 1993; see Table 5 on the next page) was the school statement of purpose, which may have implications for the effectiveness of the teachers as previously stated. The failure to have this indicates that teachers in both locations may not share school purposes.

Student participation in course selection was equally important in the procedures of both systems. In Ontario, of added importance was the teacher participation in course development. This gave some sense of ownership to the Ontario teachers as the course of instruction at the classroom level was developed by them in response to the needs of the students within the overall curriculum framework (Fullan, 1991).

The schools laid the grounds for the exclusion of the low attaining students by the nature of very informal grouping mechanisms that were not questioned. The teachers do not have high expectations for low attaining students, which may be self-fulfilling (Rosenthal, 1968). These students can achieve (ibid.) although they require more teacher-support through schooling and training (Hunt, 1971).

Society, through the mechanism of schooling, appears to choose not to afford a level playing field for this sector of the student body. The teachers of both systems reflect this view. Table 5 presents the involvement of schoolteachers in school policy matters.

In Ontario, the greatest involvement of respondents was with the curriculum framework or scope and sequence, which influenced the day-to-day work of the respondents. In Scotland, of most interest was the policy involving student behaviour codes, which was an area of high interest in Ontario as well. Of least interest in Scotland were the procedural rights of students, which was also of minimal interest in Ontario next to establishing appeal procedures.

Table 5

Teachers' Involvement with School Policy by Country*

Policy Involvement	Scotland	Ontario
Total Responses	N = 43	N = 47
Curricula content	10	27
Framework	22	35
Assessment criteria	9	20
School Linkage	24	30
Professional issues	17	17
Procedural rights	1	6
Appeal procedures	8	3
Community liaison	10	27
Attainment criteria	8	24
Behaviour codes	26	31

*Based on multiple answers from each respondent

The schoolteachers in both areas focused generally on their own working conditions, and they had minimal interest in issues where students question their authority through appeal mechanisms. As some interviewees (1993) noted, 'crowd control' of student behaviour was the day-to-day emphasis in the classroom at the same time as attempting to cover curriculum that was beyond the capacity of some of the students.

The teachers spoke of the students who were marginalised in their classrooms and by their more academic peers. Those students that stay on were generally the quiet and more conforming ones who did not create classroom problems. Some teachers were frustrated when they believed that there was an unrealised role for schools with these students. Some (n=3) reflected that 'things are as they should be' when asked about the schooling for these students (Interviews, 1993).

In Scotland and Ontario, policy did not distinguish technical from vocational education, nor did it distinguish these two from practical training, with any implied attendant level of difficulty (HMI 1989; MET, 1989).

The levels of difficulty in technical, vocational and practical training

in the school policy in both systems did not appear to be rationalised through school policy as it relates to programme. The national assessment document in Scotland outlined how to differentiate test items (SED, 1988). Woodcraft, metal craft, plastics, elementary technology, drawing, design and safety are the written tests. Woodwork, metalwork and drawing are the practical skills that students take in Secondary Two.

While the national policy predetermined written and practical tests, the schools were not differentiating the two aspects in terms of rationalising technology courses. The highly technical and theoretical aspects of technology, which appeal to the high attaining student, were not as evident in the assessment (SED, 1989).

The issue regarding the test item 'Drawing Without Instruments', for example, was that the very best pupils were capable of identifying sectional views that incorporate the accepted methods of projection (ibid.). The document did raise the question about how student ability relates to curriculum emphasis. In this instance, the projection system and visual comprehension were identified areas for student development. Feuerstein (1979) has developed a general programme for low ability students including the visualising of the rotation of an object related to this question. Software programmes are available, and they develop this skill or concept of visualising objects rotating. This example illustrates the various levels that incorporate multiple intelligence (J. Oppenheimer, 1990; H. Gardener, 1991).

Ontario respondents indicated their involvement more often with the curriculum framework than with content at the school level. School policy provided the teacher with the levels of difficulty, concrete versus abstract, for curriculum development (work experience and formal schooling). Teaching activities and methods to provide for all students would take into account student learning styles (Lazcear, 1994, cited in FWTAO Newsletter, 1995). This recent direction in Ontario did appear to be a consideration in Scotland, as evidenced in the Materials Development Pack (TVEI, 1991).

As the education system in each area now has ongoing funding for technology in general school funding confused the whole issue of what is adequate funding. Some respondents indicated that change in curriculum

and practice required new funding; almost an equal number held the position that it was a matter of how you redirect what is already in the budgets.

The suggestions on the questionnaire from both education systems did appear to reflect an understanding of the education needs of the low attaining students. One Scottish interviewee (1991) related the experience of providing a work experience for low attaining students that generated income for their Authority. When the other Authorities replicated the programme, they underbid the originator. The programme lost its revenue and ultimately ended. This staff member expressed displeasure with the way in which Authorities and the academics proceeded. Provision of such programmes providing skills for work were infrequent for low attaining students.

In Ontario, the other end of the spectrum found expression. One interviewee proposed that teachers should not be expected to 'baby-sit' these students and, further, that other provisions should be available as this was not 'education' or learning.

Bell found similar attitudes regarding maintaining these students (Interview, 1992) and he observed in Scotland how empty the schools seem to be. This may reflect students' views of the appropriateness of school programmes by their truancy, early leaving or dropping out. It is uncertain how the policy meant to serve the disaffected students in each location. Certainly some policy required developing that could provide publicly funded secondary schooling for all students if one holds the view that schooling is not only for the academic students.

The responses to questions on school policies expressed views of how to make improvements. The respondents generally supported working through the management hierarchy. This appears to be an acceptance of the hierarchy, but the number of teachers who have actually proceeded and been successful declines to about 20 per cent of the respondents. Who then does determine school policy? How significant are frontline personnel in the hierarchy? Schoolteachers, the Authorities' or the Boards' personnel had limited roles in the implementation that determined how the addition of technology education could improve education practice.

The next section compares the form the programme component took.

6.4.3 Comparison of School Programmes: New Definitions of 'Relevance'

The main contribution of the senior Scottish personnel was in determining the programme framework that the teachers implemented within the constraints of the curriculum. In Scotland, the SED's strategy towards school programmes used the subject or discipline networks to develop the modules. This resulted in an extensive use of the module format with the MSCs methods by the technology teachers. The use of this format in all disciplines meant that the revisions to written curriculum were easy to use and some material was given to all groups of students (Interviews, 1991).

Unlike Scotland, in Ontario, individual classroom teachers had responsibility for adapting the broad guidelines for curriculum. This was in contrast to the network system established in Scotland and the sharing of modules across Authorities. Therefore, in Scotland, the curriculum took on a more standard form as compared to Ontario.

In Ontario, effectively one cannot say what curriculum students have in common, whereas, in Scotland there was a shared understanding of what the course content was. Mindful of the inequalities in schools, a compounding effect occurred for students as they fell 'out of step' with the school timelines. The Ontario variations were explained within the organisation of the curricula into the seven broad content areas listed (MET, 1991). Not all areas were available in each school, as teachers' technology qualifications determined availability. In Scotland, any qualified teacher may teach technology modules within the general areas. Additionally, there was a wide range of module units within technology courses for selection if they are available in a school. This research did not explore the distribution, but Croxford et al. (1991) examined the distribution of modules.

No study of technology was available in Ontario and cancellation of a Ministry report planned for 1996 occurred due to government cutbacks and strike. Ontario had the wider diversity in courses of the two systems, but how exactly they compared to the modules and the technology course is open to discussion. Fullan (1984,91) argued, from the position of planned change, that implementation should not rest on an individual decision-maker, in this example, the classroom teacher. Scottish

networks allowed for shared decisions, but in the Ontario classroom, the adaptation of material rests with the individual teacher.

In Ontario, the intention of the curriculum change was extensive both in content and in process. The programme of study moved to a project base that is problem-oriented and supposedly student-centred. Those who developed visions of 'Broad Based Technology' did not provide courses of study to the classroom in any subject area. No specific consideration of the basic level students or those students who in the past benefited from apprenticeship programmes occurred. Residues of the old curriculum remained as some teachers continued to teach with it. Some interviewees (n=6; 1992, 1993) criticised the new approach as a waste of teacher time because everyone became involved in 'reinventing the wheel', whereas, the MET argued that teachers learned the curricula this way and 'made it theirs' with this method.

While Ontario provides a contrast to the Scottish approach, each approach obscures how it benefits the students since outcomes were not available because during the period of this research full implementation had not occurred in either location. While each location permitted teachers to adapt programmes to suit student needs, we can infer from the discussion that the curriculum structure and assessment remained barriers to developing capabilities of low attaining students.

The course selection may be seen as a function of limited student participation (Fullan, 1991). While both systems provided for student participation, it was limited to the available courses, the recommendation of the teacher and those available to 'fit' in the student's timetable. Courses were not always available due to low student numbers or teacher availability. While Croxford et al. (1991) noted that students in Scotland could complete modules in four different settings, access was not open because of the limits to the courses in secondary school and the other setting required leaving secondary school.

In Ontario, research was unavailable on course selection, comparison of student participation and the factors influencing which option was most successful for which student group.

At the school level, many teachers interviewed in both locations (1992,

1993) were proud of their unique programmes. Running multi-level programmes challenged the teachers who indicated that those students who had difficulty reading and following directions were not successful. Most teachers in both systems expressed concern for these students. They indicated that the new programmes were unsuitable, moved too fast and asked too much of these students.

Teachers in Ontario, near the end of their career, thought earlier programmes that were available on a job-training level were more appropriate to these students. They thought that the low attaining students needed the basic technology skills that were taught previously. One teacher (1992) observed that the students were making the same mistakes, but with the use of computers, there were no smudgy papers from their corrections. The lack of progress by students in available programmes was a major frustration expressed by teachers, and was a frustration they observed expressed in students' behaviour as well.

To summarise, the respondents were of the opinion that the limitation to the low attaining student's opportunity to benefit from the technology programmes occurred with the curriculum established by the centralised staffs. At the classroom level, technology teachers in both systems made some adaptations of the curriculum for students.

In Ontario, teachers were of the opinion that the previous skill-based courses provided these students with skills for work while this form of course remains unexplored in Scotland. Bias in their opinions may result from their experience and perhaps their qualifications but the statistics kept in each location indicate the need for further improvements to the education for these students.

6.4.3.1 Comparison of Work Experience in the Curriculum

The questionnaire and interviews also dealt with the appropriateness of work experience for low attaining students. The systemic consideration of these students follows in more depth here.

An option for Ontario students was to obtain co-operative work experience which directly relates to work and subject choice. The more traditional work experience of one week was career awareness traditionally attached to business studies and guidance.

In both Scotland and Ontario, no changes in the proportion of work versus schooling were offered for different levels of students. Each system provided a work experience policy that treats all work experience in equal terms. This form of equal treatment did not take into account the differences in the ability of students to benefit from work experience of varying lengths and types. The equal but different aspect of equity, which provides different benefits to level the playing field, was not considered. Each system's policy attempted one form of equity, but the academic tradition superseded the knowledge about how various students learn and how to increase their attainments using additional appropriate work experience.

However, the fundamental issue here is relevance in terms of the specific needs of a segment of students for concrete practical activities for learning. Fullan (1984, 1991) poses these as contradictions between cognitive or academic goals, and personal or social goals. For low attaining students, we are addressing not these two goal sets, but the more basic skills contained in the goals. For example, reading would be at the word recognition level for students who are physically in the adolescent developmental stage but functioning cognitively in a range of stages which may be primary or elementary.

In Ontario, work experience was available in most courses, as each course contains a careers policy; whereas, in Scotland, approximately half the schools of the respondents provided one week of work experience in almost all subjects. The publicly funded separate system in Ontario was an exception as it has 40 hours of community service as part of religious education.

The two education systems varied as to the number of schools that provided extensions to work experience according to the questionnaire. Permanent job placement for low attaining students and multiple placements were available in a few schools in each location. This uneven implementation provides a further illustration of inequity based in views of student needs for employability. The work experience was not limited to any one discipline but Ontario uses work experience twice as frequently in technology as Scotland with a central policy beginning in elementary schools to view technology as applied science, to use projects as a basis for studying technology and to have a careers aspect in all courses.

An overlapping area in Ontario during that period was the *'Computers Across the Curriculum' guideline (1991)*, an overall policy for all subjects to use computer applications for about 10 per cent of their course time. This policy was also a funded policy initiative to emphasise information or communication technology, including e-mail and the Internet, for use beginning in the elementary division.

Computer studies, another subject available to low attaining students in secondary schools in both locations, focused on the applications of computers in a variety of settings. In Ontario the course content ranged from basic programming commands to computer programming, whereas in Scotland, according to Conlon and Cope (1989), the course remained at the operator level. The computer-based electronics, repair and applications, considered a technology, was for higher attaining students. Because some of the divisions were arbitrary between subjects with subject integration, teachers negotiated these classes. This process was not always successful since the student numbers in departments affected staffing.

Practical work experience was the method of choice of Ontario teachers to support the work-related skills for low attaining students. These teachers maintained employment skills as the emphasis for low attaining students in the basic levels of all courses. There was not the concern regarding vocationalism expressed (Dale, 1985, 1989), because the future employment aspired to by these students would likely be in the unskilled sector.

6.4.3.2 Effectiveness of the Curriculum Changes

Schoolteachers in both locations when asked, from their perspective, to indicate the effectiveness of the initiative for low attaining students in their school gave the following responses.

Table 6
Respondents' Views of Their Initiatives'
Effectiveness for the Low Attaining in Scotland and Ontario

	Positive	No difference	Negative	No comment	Responses
Scotland	15	16	5	16	N = 52
Ontario	6	3	5	6	N = 20

Ontario's pattern was indiscernible given that the curriculum was not

primarily intended for the basic student and of a nature from which they could benefit, therefore this result was not unexpected because of the interpretation of the inclusive core policy. The trend to move these students into the general level on request with the NDP 'Integration' initiative reinforced the level of support for these students. In Scotland, the responses were also mixed. For students attaining at the foundation level, these results are similar to the report by Croxford et al. (1991) and Beck and Black (1988). These and other sources cited subsequently provide some attainment information.

It is unclear how it benefits identifiable student groups in school settings to suppress attainments as the respondents have. Other researchers, such as, Brown et al. (1985) in Scotland and Fullan (1991) in Ontario indicate that teachers do not wish their teaching evaluated in terms of attainments.

In Scotland, regarding effectiveness of the initiative, the general questionnaire responses were to provide 'more appropriate curricula'. Suggestions were as follows: material relevance, work experience, vocationally based, more practical, more activities, more variety, fewer subjects, outside school experience, lower pupil-teacher ratio, more support, personal attention, learning support and parental or home support.

In Ontario, the range of suggestions was of a similar practical work-based nature.

> Shorter class time in each area, more subjective, less daily time (Ontario, 1993).
>
> Commitment to helping these students and not by just pushing them ahead (ibid.).

A follow-up investigated the practical approaches noted as useful by teachers, the rationalisation of technology from high-end courses to practical courses. It explored the attitudes of respondents towards low attaining students receiving practical training with certification. Apprenticeship and its co-ordination or integration with relevant school structures (Prais and Wagner, 1985) is the basis of this question.

In Scotland, the predominant view was to have secondary education

involved but co-ordinating work placement with the MSC programmes. In Ontario, the preference of those responding was integration with secondary schools functioning to provide part of the introductory hours of apprenticeship, this reflected the present approach. Most teachers in both places had no opinion as no comment was the most frequent response. Six Scottish interviewees (1993) indicated that the reason for this may be due to the possibility that teachers feared either approach resulted in fewer teaching positions and, therefore, regarded the question as threatening.

In Ontario, interviewees expressed satisfaction with the present arrangements. They were unaware that they could develop individual apprenticeships in unregulated trades.

Expectations in other jurisdictions were for students with low attainment to receive practical training with certification. Examination of the attitudes regarding this form of certification follows. While most respondents make no comment, those that did in each system have different views. Co-ordination, the preference in Scotland, suggested the schools retain the students for the school programme; integration suggests part schooling, part apprenticeship placements.

As Ontario had a programme to allow shop classrooms to grant apprenticeship hours, this may be the interpretation of integration, whereas, the interpretation in other jurisdictions was a balance between school and work, or placement external to schools. Interviewees did not provide a clear interpretation of co-ordination in Scotland. The respondents viewed apprenticeships as being outside the mandate of secondary school with the recent acceptance of SCOTVEC.

These opinions may be a result of the clarity of the SCOTVEC policy, the lack of accumulated experience with SCOTVEC or lack of interest in this area at the secondary school level. Ultimately, students could not attain certification for apprenticeships until after secondary school. This served the purpose of delaying their participation in the job market, and may be the intention to maintain enrolments and the funding received at the secondary school level. It also served to lower unemployment. Further Education or Community Colleges in both education systems would lose students to secondary schools in either approach. Perhaps this was the reason that work experience has a narrow

interpretation in Scotland.

6.4.4 Comparison of School Promotion Practices

Control of promotion practices largely was outside secondary schools and in the professional practices of both education systems. Respondents in each location indicated a preference for a variety of options for promoting students. This variety while supported in the TVEI"s Materials Development documents was negated with the external examinations.

Ontario's documents supported the variety in practice at the time of this research but was moving to external examinations of students.

Table 7
Promotion Practices Used by Scottish and Ontario Teachers*

Promotion Practice	Scotland	Ontario
Within subjects each year	35	37
By year all subjects	18	17
Partially with fewer subjects	15	16
by modules or units	22	13
other (no comment)	4	1

*Based on multiple answers by each respondent

The preference in Scotland tended toward promotion by subject. Similarly, in Ontario, the practice was promotion largely by subject each year. The flexibility in each system did not allow students to progress in subjects at their own rate or slower than one term for reasons of tradition rather than learning. Some students in some courses could be successful if allowance for other rates, such as two terms, to cover the material was acceptable. Time would not be a factor in evaluating student attainments. Each system would need to refocus on learning as the main purpose of schooling and not the selection of students for different outcomes.

The Ontario policy documents incorporated the directions for teachers in terms of student groupings and multiple evaluation techniques. The senior administrators maintained the status quo at the school level in terms of promotion at that time. In Scotland to some extent and in Ontario classroom tests were the teachers' mandate. Senior level educators were more subject-curriculum focused and not involved directly in promotions of students or student evaluation issues.

In Scotland, examinations were external. This separation of evaluation from teaching reduced the influence of teachers over promotion. This approach conflicted with the continuous assessment of students related to the material taught at the school level according to some respondents. The student profiles, another parallel development in Scotland and Ontario incorporated this latter approach.

Respondents in both education settings indicated they knew how to provide evaluations that increase the success of low attaining or less able students. The Scottish teachers had the policy from the MSC for the varied assessment approaches and for the foundation students, external examinations were part of a varied approach. Some of the reasoning behind this double system has to do with standards that the external system of examinations purports to uphold (SED, 1989). Atherton (1989) noted that many unidentified students have special needs; there may or may not be differences in degrees of severity from those identified. The statistics regarding special-needs students and low attaining students overlap in both countries, which adds to the problem of identifying the circumstances of low attaining students. We saw that special-needs students have accommodations in all areas of schooling; the formal assessment and identification defined these students to provide additional education resources, which were unavailable to their counterparts, the low attaining students.

As in Ontario, all school-aged children are entitled to a publicly funded education programme. Included are the profoundly retarded who, in Scotland, were in special settings. The Warnock Report (1981) said Scotland did not meet special needs in mainstream schools, but continued the practice of diversion or exclusion to special schools. Ontario reported unmet needs but the extent is unknown.

The examination system in Ontario was not external to the Boards thus allowing for alternative promotion practices. To clarify the differences perceived by the respondents about students with special needs and low attainment, the next table compares functional differences.

Table 8
Teachers' Views of Functional Difference: Special Needs and Foundation/Basic Students by Country*

Distinguishing Features	Scotland	Ontario
Record of needs	9	6
Attendance	1	0
Ability	22	20
Attitude	3	1
Nothing	7	4
Resources	1	0
Total responses	43	31

*Based on multiple answer by each respondent

In both cases, ability was noted more frequently. The ability response was of interest for Scotland because this is classified under the full range of learning difficulties and includes aspects of emotional disturbance, difficulties in hearing or seeing or inappropriate instruction according to Atherton (1989). In both settings, ability was cause for identification, but no clear practice provides for the non-identified less able student.

6.4.4.1 Comparison of Attainment Measurement

The way students were tested influenced their results. The low attaining student performs better on practical 'hands on' methods of determining what they can do. Examination of testing approaches at the school level was to identify practice and determine their appropriateness. Generally, teachers used a variety of testing approaches as encouraged by the documents.

Table 9
Types of Classroom Tests Used in Scotland and Ontario*

	Scotland	Ontario
Total responses	47	43
In-class evaluation	37	39
Year-end	18	27
Term testing	21	33

*Based on multiple answers by each respondent

The basis of practice surrounding testing in both Scotland and Ontario was on in-class evaluation aside from the Scottish national tests, with

term tests favoured over year-end. For Scotland, the in-class test relationship to the external examinations was not direct. Determination of attainment level, curriculum options and the certification attached during most of the eighties remained attached to the SEB examination; later the mixed approach developed.

Further questions arose about the appropriateness of the promotion practices to provide for equity, given the responses to this question. The promotion practice appeared to create a further disadvantage for low attaining students in addition to the programme practices. Both systems did not emphasise work-related skills or their assessment as noted in the programme section.

Only in some school settings in both systems was partial completion recognised for students who may be capable of doing the work but at a different rate. This consideration is important. Some of the debate on ability emphasises time-based or speed tests being the distinguishing feature of the more able. Both familiarity and previous experience are factors influencing attainment on timed tests. Classroom activities play an important role in preparation. The test results did not necessarily imply that the students cannot accomplish the task.

The fact that external examination and curriculum were beyond the teachers' control means that teachers at the school level have little discretion. The external bodies of the education system removed some of this discretionary decision-making from teachers, an aspect of professionalism that now applies to most of their functions. There were very rare exceptions to the general promotion practices across each school system, with the exception of those designated special needs (Interviewees, 1992, 1993). The number of high positive responses to this question has little influence on student certification.

The teachers (ibid.) in both education systems were conscious of the lack of progress of the less able student. They felt pressure to move students along without achievement and, at the same time, pressure to provide the defined curriculum. Teachers mentioned too few opportunities to adapt to a multi-level grade given the definitions that create their school environments. The lack of student success was a major concern and thought to be beyond their mandate to resolve, by all 16 interviewees. Most teachers in each system reflected the academic bias of their system

contained within course subjects and expectations by level. School responses to the less able students were inadequate and a matter of role conflict for those who think more relevant or appropriate schooling could be provided.

6.5. Comparison of School Practices Affecting Policy

The comparative analysis of the technical initiatives in Ontario and Scotland has now been presented as they were provided to the low attaining student from 1983 to 1990. This section examines the control exerted by practice on the implementation of policy. A. Hargreaves et al (1991, unedited and unpublished) suggested that the usual way to study policy is to begin with the policy of interest and trace its effect upon practice. Another approach to studies of the implementation of policy Cohen and Ball (1990) indicate that the reverse of policy to practice is the study of practice as it 'filters' policy, and can provide another view.

Practice analysis in this comparison defines the multifaceted reality (Hargreaves, 1991) of how each respondent and school dealt with the questions of policy. Chapters 4 and 5 examined each area's policy and implementation, conscious of the pre-questionnaire interviews and the policy documents, using Whitmore's (1984) approach to unlayer the policies, as they were first proposed to the system in each country. Examination of the installation of the policy at the school level occurred through the questionnaire and additional interviews in the context of each education system. Through this approach, identification of the pluralistic reality and dynamics of the each system was possible.

The difficulty is that presentation in two-dimensional written form gives a false impression that events in implementation or the practices in schools are uniform, logical and sequential. In fact, the policy changes seen from the position of teachers interfered in their 'logical and sequential' practice. Fullan (1992) identifies this as lack of compatibility of education reform. He wrote of the overload on the educational system, the vagueness of the technology policy as to purpose and goals, as well as means and knowledge of implementation. Serious change is complex; both the individual and organisation need capacity building (Fullan, ibid.). Those are not forthcoming given the rapid extension in Scotland and Ontario and the failure to fully fund extension in both systems.

The serious issue of lack of resources permeates each education system in relation to the new technologies, the maintenance of equipment for the schools and basic funds for the rest of the schools. The education systems are unable in practice to level the playing field for all students and, therefore, the inherent advantage of some continues.

Downey (1988) distinguishes between policy-making, how the system works, which has been discussed, and policy analysis, how to make the system work. In this comparison, the curricula policies are both reactive to governments, as we have discussed, and proactive with innovations, resulting in contradictory directions to teachers and contradictory conclusions regarding each policy, a possibility noted by Yin (1994). Each initiative involved the authority of expert educators to plan the curriculum implementation, through the network approach in Scotland and the curriculum committee in Ontario. Each area relied mainly on these experts and they shaped the implementation.

The teachers defining the style of implementation not only react to governments but also may, at the same time, be proactive on behalf of all students. This style was clearly identifiable in the use of the common format in Scotland. It was less clear in Ontario where the policy was less relevant for all students including the low attaining according to many of the practising teachers. However, in the documents and curriculum, the relevance for the high-end students was clear. Relevance remains an ongoing issue for the rest of the students in Ontario. For Scotland's low attaining students, distribution of the employability benefit of technical education also was not equal as will be demonstrated.

The possibility that schools did not make a difference is now considered. The overall structural organisation of society appears to make the difference for the top half of the population (Ashton et al. 1990). That schools make no difference at present for employability, the aim of each policy, particularly to the bottom half of the population, is a point raised by Ashton et al. (1990). In their discussion of the downward pressure on the youth labour market due to the segmentation of labour markets and, in particular, on unskilled youth, he observes:

> It is the way in which education and training are linked to the

> education system in Britain...
> Studies such as TVEI ...do not fundamentally change young people's orientation towards school (Bell & Howison, 1988). For some it has made school a more pleasant experience and the curriculum more relevant to their personal experiences.. (p. 216)

In addition, he quotes Raffe (1988) in relation to Scotland:

> [TVEI] makes no significant improvements to their prospects on the labour market. (217)

Ashton et al. (1990) go on to say that the Youth Training Scheme as an unemployment strategy keeps students occupied and gives them an income, which the TVEI does not. This in fact is a factor influencing students to leave early, an issue that Senker (1990) made as it can provide access to skilled jobs.

These were the structural difficulties Ashton et al. (1990) identified, but the final analysis, they said that the innovation funded by MSC [using SCOTVEC in Scotland] encouraged schools to co-ordinate [with SCOTVEC] and to recognise out-of-school work experience. Except for the length of the work experience and level of industry acceptance, this implementation resembles the German system. The initiative did not change student employability, a purpose of the programme. There continues to be a structural problem between education and industry and between the MSC and education, the basis of which may be ideological as well as the structure of employment.

For Ontario, the wider considerations surrounding the issues of students and their futures in society are lacking. Employability of the advanced students is the main consideration put forward.

These initiatives faced major obstacles in dealing with employability and vocationalism. The practices in schools used by teachers maintain the structures and relationships between student groups in spite of the changes introduced.

The considerations needed to produce more equity and opportunities, which includes citizenship and expression of social concerns, are explored in the conclusions and recommendations that follow.

CHAPTER SEVEN: CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary

This comparative case study has focused on the relevance of the technical and vocational policy initiatives of the early 1980s for low attaining students in Scotland and Ontario at the secondary school level. These initiatives were a response to global economic pressures and a response to criticisms regarding the preparation of all students for employment. Each location funded changes within curriculum initiatives to prepare all students for the world of work.

This comparative case study research used a variety of research methods in combination to analyse the policies and their implementation. Identified were issues of control, both political and professional. At the level of the schools, the questionnaire examined how the functions of teachers influenced the schooling of low attaining students because of the policy. The analysis of each implementation provided the basis for comparison. The common issue of employable skills was the basis of each technology policy. Teachers in both Scotland and Ontario used curriculum practice as the vehicle for controlling the new politically directed policy.

A review of the literature indicated that an effective school has organisational qualities that support high expectations for the full range of students. The theory behind student evaluation indicated the assumptions about the full range of ability and the environment of schools were important factors for the implementation. Furthermore, student characteristics were identified, important considerations for teachers in their lesson planning to achieve attainment; teachers too were important factors as they defined attainment. These structures and functions of schools establish the opportunities of low attaining students.

In each education system, a different curriculum-based approach resulted in response to the policy direction. This thesis examined the relevance of the implementation in relation to its effectiveness for low attaining students. These students have the fewer privileges because of the orientation of secondary schools towards academic students. The planning, school policy, programmes and promotion of low attaining

students reflected the approach of educators towards them at the school level.

The system-wide response in Scotland's was to use 60 per cent of the funding for the TVEI network of educators, which established a common format to provide curriculum in a module form. This effectively controlled the curriculum and was one innovation of the policy that the senior Scottish educators supported. This research indicated that the way in which the SED controlled the implementation was through these modules and developing its own certified technology course; the initiative resulted in some substantive change in Scottish secondary schooling.

Some of the change benefited more those students who received access to high-end computers. This also illustrates the continuation of the academic bias of secondary schools. Offsetting this direction was the use of the modules for certification including the low attaining student through the SCOTVEC. This somewhat resembles the German model. Lacking is the length of work experience and the confidence of the employers regarding the skills of the low attaining student. The provision of one week of work experience, while the right methodology, is inadequate to give the students suitable time for learning practical skills or gaining the support of the employers.

For teachers, there was a lessening of their professional decision-making and flexibility in the learning activities with the use of modules. The students' response to the curriculum was that overall staying-on by all students slowly increased (SOSB, 1991), for reasons other than curriculum, mainly lack of available jobs (Raffe, 1988). The attainments of the Scottish Certificate and the SCOTVEC modules increased in the short term, to 1993, according to this research (ibid.). The wider issues around providing employable skills raised by the TVEI for all students are for those students to contribute to their community and to become self-sufficient.

Similar employment concerns led to Ontario's development of a new curriculum policy document by a select group of subject specialists. The examination of the policy change in Ontario used the same analytic approach as that of Scotland. Ontario's definition of relevance and control aside from the curriculum development includes the same teacher

functions. While the policy was directed more towards the advanced student, the basic student experienced the change in methods to project-driven curriculum with the withdrawal of trade courses. The policy was a substantive change to the number and the organisation of courses offered. Initiation of funding followed an indication that the new policy was experiencing implementation problems. The MET's response to the resistance to the new courses was to fund the 'new technologies' equipment at the school level. This funding practice gave the appearance of commitment to the curriculum policy by teachers.

The application process for the funds was the method by which the MET controlled the curriculum at the school level. Before the initiative, the curriculum implementation from a MET curriculum guideline was the Boards' responsibility. The funding for this curriculum change both upgraded classroom equipment and improved the relevance of shop courses to industry standards with the use of high-end technology. The reorganisation to seven broad-based areas of study was unpopular in the field, and the trade-based teachers resisted implementation. This broad-based grouping used all levels of courses, which means that former practical approaches used with low attaining students now conform to the project approach used in the other streams. This creates problems accommodating the low attaining students in the curriculum for the teachers.

This research concludes that there is a need for further adjustments in both systems to provide equity to the full range of students, the common policy principle of each system. Equity would mean that the benefits of education, one of which is certification, not only would be equally available to the low attaining students but recognised for employment even when jobs are scarce. The benefit to the student is recognition of their capabilities.

Since employer confidence in the certificate is essential, further development of the links to the community is required in both areas. In this way, at least opportunity equal to high-attaining students would be available to these students as a benefit of education. For those students unlikely to find employment, for economic or other reasons, their participation as citizens in the wider community needs to be addressed by the schools, concerned industry, the community and social partners. This community-development approach addresses employment as

well as the questions of citizenship and social concern regarding low attaining students.

Within a view that supports continual improvement, educators may choose to address the issues presented by the low attaining student. At the time of this research, teachers indicated concern about their working conditions (Questionnaire, 1993). Their views regarding alternative provision for the low attaining students are not clear. For those students for whom the present provisions do not address their learning needs, an option that supports students towards independence needs definition. That option is usually the 'life skills' approach and provision sometimes is external to secondary school.

The evaluation of the results of each initiative leads to conflicting impressions regarding the efficacy of the initiatives (Yin, 1994). The use of a multi-level but common case study approach of the policy analysis illustrated the strengths and weaknesses of each implementation. The qualitative and quantitative approaches allowed for description of the complex relationship of education to work on behalf of the least privileged student.

Part of the difficulty of identifying the circumstances of low attaining students remains in the dominant academic orientation of secondary schools. Because secondary school teachers are subject specialists, the academic formulation of the initiatives is such that there is resistance to the trade and work experience aspects of the new initiatives.

7.2. Conclusions and Recommendations

Student outcomes are an inexact measure of policy effectiveness from a theoretical point of view, given the role of the school. Traditionally, schools are not responsible for student attainment rates or accountable for the low attainment or failure of some students.

Chapter 2 outlined the main causal explanations for low attainment with Johnston's comprehensive theory. In this research, by means of triangulation, policy analysis examined each system's approach to defining students' ability and their attainments. The views of teachers in each location assisted the comparison of their experience with the students of interest. In their view, in addition to some learning problems associated with reading and writing, the behaviour of students

is an issue.

With the comparison at the school level, the question arises: Is there a better structure or relationship within systems to assist educating the low attaining and non-attaining student?

As discussed previously, in her research in America, Oakes (1992) argues against streaming students by ability group. Streaming is the formal Ontario approach to these students and the informal Scottish practice called 'setting' in the early 1980s and the formal practice with Standard Grade. Her research indicates that the information provided to students is different given the perceived attainment level. There is substantiation of that view in the teachers' responses (1993), regardless of classroom provision. The less attaining and less able students in streamed (tracked) schools receive information more slowly and have less demanding topics and skills (op. cit.). These students tend to have fewer well-qualified teachers because of in-school politics according to Oakes (ibid.)and in Ontario, based on qualifications. There also tends to be unequal distribution of resources to the less able students, according to her, which this research confirmed in Ontario but not in Scotland.

In this research, based on school size, mixed-ability classes are the most prevalent classroom structure in each location. The practice of grouping into high, medium and low groups found herein defines the differentiated approach.

In the discussion of ability, the practical reality of policy implementation was revealed in what the students were provided and is part of the discretionary decisions made by educators, who helped define the curriculum. On the one hand, technology teachers interpret behaviour in addition to ability as the main reason for non-attainment. Whether behaviour issues result from the structure of education requires research comparing education structures and practices. On the other hand, King's research (1988, 1989) supports the observation that the attainments of the low attaining students improve in dedicated vocational schools. As with other areas of research, there is no definitive conclusion on the various positions regarding the proper relationship of technology to academic provision.

To date, there is no clear link to the employment of the less able student in the universal provisions of technology policy in either Scotland or Ontario. The main role of each education system reported here is sorting students out for other systems, for employment, further education or social programmes. This role effectively redistributes more benefits of education to the higher-attaining students. The failure to implement the core policy principle to serve all students is a policy deficiency more evident in Ontario. In Scotland, the practice attempted to reflect the direction of the policy.

Implementing any school improvement, reform or change is a complex task, particularly in pluralistic societies where values and norms between social groups vary widely. The results of innovation range between schools, each with unique populations and environments. The schools and teachers attempt to give equal support to the attainments of all students. To resolve the dilemma of conflicting norms and values in schools, the local educators and the community together could define the approaches and values of the school. References in the literature indicate that teachers themselves have problems in arriving at sound practice (Dennison, 1984; Fullan, 1994).

Staffing and resource limits of schools resulted in less attention to developing community links and programmes, and contributed to the maintenance of the status quo for the low attaining students. To address the complexities, Fullan (1994) identified through his research the practices that are most successful in producing results for policy changes. However, research findings do not appear to reach the practising policymaker, analyst and teacher.

The change theories of A. Hargreaves (1991) and Fullan (1994) consider the need for closer relationships between research and practice communities. The practices suggested by research collected by Fullan and relevant to this research that improve student outcomes are as follows:

1. protocols for assessing objective alignment between policies and procedures including other sectors of social policy (in addition to education) [seen in this case with MSC]
2. assessing student learning with progress as the focus [as encouraged in the modules]
3. proxy measures of systemic reform
(a) amount and quality of professional development pack [as with TVEI Materials Development Pack]
(b) activity and effectiveness of multilevel relationships with external facilities [TVEI research]

(c) quality of problem and product sharing [the module]
(d) integration of network activity with priorities and planning and implementation procedures [the TVEI network]
(e) links between school-community development [seen here with to some extent as education working with SCOTVEC]
(f) monitoring inquiry, assessment, examination of data and action [the evaluations]
4. collaboration in the culture and structure of schools/class, new use of time, teacher development and increasing quality
5. backward mapping: do teachers understand new things with coherence for work and policies (Fullan, ibid.).

In many of its structures, TVEI had the elements indicated for improvement. Ontario lacked most of these structures and coherence.

In conclusion, the comparison of technical and vocational training and attainments reveals the limited but positive approaches to the students of interest to this research. The literature indicates that few evaluations are available, which is an indication that education and other systems overlook these students. It is recognised that there is difficulty identifying the students in the context of the population in schools. This research indicates that providing technical and vocational education to low attaining schools is a very complex issue that teachers define through their school functions.

However, research is going forward into areas of appropriate programmes based on relevant assessment. The new assessment methods that Scotland is implementing and the assessment methods in Ontario related to practical curriculum are in progress, however, lacking is research on the amount and type of practical application the less able students require. The organisational structures to which Rutter et al. (1979), and Chubb and Moe (1990) direct our attention to, encourage the attainment particularly of low-ability students. These approaches with practically based curriculum along with high expectations, which include certified work experience, have some merit. The innovation in curriculum with certification of skills for work and work experience in Scotland with the TVEI effectively began to improve these students' outcomes (SED, 1991). Practical assessment has not been the practice in either Scotland or Ontario.

Two of the researchers discussed have indicated two further areas for study. For the future, Paterson (undated) indicates that perhaps relating statistical methods with case study may be of some benefit in identifying schools with high levels of success. Such research may lead

to improving the outcomes for the lower half of the school population given the same structure. While this suggestion points to the studies of effective school research found in Chapter 2, it does not provide for experimentation with other structures that may have merit.

This research finds that teachers and others require more information as to the possible expectations for low attaining students and continuous improvement in attainments. Bringing together the above two suggestions in a pilot would be a start, although the first consideration would be to study the attitudes of educators to this segment of the population in relation to expectations, potential and outcomes.

Oakes (1992), the second researcher with suggestions for further study, indicates the need to be able to track the students with low attainment for monitoring the provision for these students (1992). In this way, it will be possible to determine that these students receive equal efforts. This does not imply segregation by attainment. Earlier discussion indicated that there needed to be public awareness surrounding attainments and capabilities of the low attaining students to include them in the community and citizenship.

An even more fundamental suggestion is put forth. As it appears in this research that the entire education structure in each system deflected the intent of the initiatives, this thesis recommends that more specific measurable aims for each group of students be attached to education policy when initiated by a governing body. Tracking would provide for accountability for student groups, public funds and visible changes, which would allow for public evaluation to ensure that there is equity among groups.

In addition, the opportunity to establish working relationships with other sectors of the community that are either now or will be working with this population were not fully taken up in the implementation of each system. The successful networking established in Scotland could encompass the external services on behalf of these students. In spite of decreasing resources, combining efforts together with effective programming starting in secondary school can be realised for these students. Neither education system raised or participated in a larger discussion expressing social concern for the students who are not tied to production, the method of valuing citizens reflected in both

initiatives. The discussion of education that prepares students for the reality of the employment market now and for their predictable future has been avoided throughout the research and planning.

Because networks may be part of the fragmentation of effort, a problem in terms of working conditions, a second long-term strategy Fullan (1991) suggested is that of a reculturing or restructuring, a new conceptualisation about teaching-instruction. Site-based school management, the newest structure identified in Ontario, leaves the culture intact according to him (Fullan, 1994). Further, quoting Donahoe (1993), Fullan suggests that structure, culture and time need redesigning. The implications for teaching that he proposes include new knowledge and skills, collegiality, context, continuous learning, moral purpose and the change process. These suggestions appear radical and in the present climate without support.

Hunt's (1971) research also warrants revisiting. With self-instruction computer programmes available for learning, the teacher's role requires redefining and refocusing, as suggested above. Although the TVEI did accomplish some of this redefining with the modules, the SED (1989) objected to the emphasis on student self-evaluation. The low attaining students require more direction and programme modifications from the teacher. A paraprofessional, such as a teacher's assistant, could carry out the actual activities, freeing teachers to work individually with those students who require more assistance. The other sections of the student population are capable of being more independent from the teacher. Regardless continuous improvement could address some of these issues.

Finally, to emphasise the importance of teacher professional development, Fullan (1994) states that '[one] can't improve student learning without teacher learning.' While he observes that '[teachers] do not specifically know what they are doing', this research found that teachers do have knowledge of these students, but Fullan's observations reinforce the point that the school environment warrants continual study to achieve continual improvement.

The outcome of this research suggests more attention to the in-service training of teachers that focus on understanding the possibilities for these students and the ways that schools could support them. Developing

community awareness and continual improvement to the technology education that leads to work would also be supportive.

APPENDIX A

DRAFT ACCESS LETTER

Dear Director

I am a Canadian post- graduate student doing a comparative study of education policy. The focus of my study is the policy of Scotland and Ontario as it relates to technical and vocational education with particular interest in the foundation / basic student and low attainment.

At this time I am seeking access to survey your school co-ordinators. I am enclosing an example of the questions to be asked. No school and no authority will be identified in the results as some of the information being requested is confidential to the authority. When compiled I will send a summary of the survey results with the current national practice and suggestions of co-ordinators to improve attainment rates to your authority.

If you are in agreement to allow me to mail surveys to your staff (which I anticipate sending out in January 1993), please sign the form below and return in the stamped envelope provided.

Thank you for considering my request.

Sincerely,

FORM

NAME(signed) _____ DATE _____

Authority _____

Dear TVEI Co-ordinator, or teacher with responsibility for technological courses,

I am a Canadian student doing a doctoral study at the University of Edinburgh. This questionnaire is part of a comparative study of secondary technological and vocational provisions for students who take courses at the foundation level in Scotland and Ontario (Canada). The research is interested in the policy implemented from 1984 to 1991 and is not intended to apply to recent initiatives or funding. The organisation of this questionnaire is in four parts: planning, policy, programme and attainment/promotion. I would appreciate it if you could complete this survey. It should take about 30 minutes to complete. I would be pleased if you would return the forms in the stamped envelope provided within two weeks. A summary of results will be made available to respondents.

Thank you for your assistance.

Sincerely,

INFORMATION ABOUT YOU

1.1 position title: (tick one)
- classroom teacher
- head teacher
- technological co-ordinator
- other (please name)

1.2 years in position_____

1.3 years in teaching_____

1.4 qualifications (tick appropriate box(es)
- trade training
- teacher training
- undergraduate degree
- other

PLANNING

.teaching in technical & vocational subjects _____%
.attending meetings _____%
.other (please specify) _____%

1.6 Is there co-ordination between the technological programmes in primary and secondary schools? yes no

1.7 Are there meetings between technological and other staff across subjects in S1, S2 and S& S4 or: yes no

1.8 If yes to the above question (1.7):

.Do these meetings involve planning of student coursing or timetables?

yes no

co-ordination of course content yes no

other_____

1.9 If yes to the above question (1.7):

what staff are involved in the above meetings which link programmes;(tick off please)

.careers officer
.guidance
.home form teacher
.assessment personnel
.learning resource/special education personnel
.technical & vocational co-ordinator
.other (name)

1.10 Is there a designated staff for coursing/setting timetables?

yes no

1.11 Do students and or their parents attend meetings for selecting the student programme? yes no

1.12 What governs the selection of the student's programme?

_____

_____

_____

1.122 If the selection is not working out how is that managed?_____

_____

1.13 When is an individual assessment done for a student who is considered to be at foundation level?(more than classroom evaluation) yes no

If no go to question 1.15

1.14 Who does this assessment? (please tick)

.classroom teacher

.learning resource/special education personnel

.psychology personnel

.other_____

1.141 Can the assessment be appealed by the student? yes no

If yes on what grounds?

_____

_____

1.15 For students taking the majority of courses in foundation level would progress of individuals be checked across subjects? yes no

1.16 What staff would provide this? (specify please)

_____

1.17 How often in the school year/term is student progress formally checked (across subjects collectively)?

(please tick)

.once a month

.every two months

.other

.never

1.18 What is the process that staff use to identify/"flag" a student who is having difficulty? (specify please)

_____

_____

(In your school what is the most common cause for referral?)

_____

_____

1.19 In your opinion, what are the reasons for under achieving in your school?(tick areas)

	In general	In foundation
• not doing the work	____	____
• communication skills: listening	____	____
• oral ability	____	____
• reading ability	____	____
• writing ability	____	____
• unable to complete practical tests	____	____
• legitimate absence (illness, etc.)	____	____
• truancy	____	____
• part-time employment	____	____
• attitude to school	____	____
• confidence	____	____
• peer pressure	____	____
• outside interests	____	____

• other _____

_____

1.191 How frequently is there more than one cause?

in a few of the cases ___

in most of the cases ___

1.192 What causes are most influential? _____

_____

1.20 In your opinion, is (are) there any provision(s) that could improve the planning for attainment of students who attain at the foundation level in technical courses? (e.g. case conferences on low attaining students)

_____

_____

POLICY IMPACTING ON TECHNICAL & VOCATIONAL EDUCATION

2.1 Is there an individual written school statement of purpose? (tick the appropriate area)

defined role for the technical & vocational co-ordinator

qualifications of the TVEI co-ordinator

requirements for transition from; primary to S1

S2 to S3

for linking the two school sections; S2 to S3
for the process of course selection
for movement within a subject to a different level of difficulty

ARE THERE PROCEDURES for:
involving student participation in course selection
movement into foundation from general level modules
subsequent movement between foundation and general level
how often a course may be repeated
when there is a lack of student progress
partial attainment of a course
continuous development or progress
taking longer on a course (e.g., 80 hours for a 40-hour course)
modifications to the syllabus / curricula
teacher participation in defining local curricula
community / industry involvement in the local curricula
parents involvement in course / curricula definition

2.2 Have you been involved with the following? (please tick)
defining regional curricula content
providing for the local framework/scope and sequence of coursing / curricula
establishing local assessment criteria
linkage / liaison provisions (1)between schools and
(2)with the community
professional issues of providing appropriate education
procedural rights for students
appeal procedures
community liaison
defining attainment / promotion criteria
establishing behaviour codes

2.3 In the definitions of the framework / scope and sequence of technical and practical education, does the policy distinguish between;
technical education and vocational education yes no .
vocational education and practical / vocational training? yes no →
If no go to question 2.5

2.4 Is work experience organised differently for credit, general and foundation?

yes no

2.41 In your opinion, does the practice reflect the policy in the authority / board?
yes no

2.5 In your opinion, are the policies adequately resourced?
yes no

2.6 An interest of this survey is the student attainment at the technical and practical foundation level, in your opinion is there policy that you would suggest for improving the delivery of education to these student (e.g.. more opportunity to practice skills)?

_____

_____

_____

2.7 Do you have an avenue to put these suggestions forward:
through a professional network
through the management of the school
through the educational authority
other?

2.71 Have you: had the opportunity to do this? yes no
been successful doing this? yes no

PROGRAMME: TECHNICAL & VOCATIONAL

3.1 Have you been involved in defining the course content that have both a technical and practical component? yes no

3.2 Are there alternative choices or routes for attainment which are flexible:
with in a technological course? yes no
between technological courses? yes no

3.3 Can students choose between these above alternative routes? yes no
If no go to question 3.6

3.4 What is the time allocation for work experience out of school that has a technological component.?
1 week = hours
2 weeks = hours
more than the above = hours

3.5 Which level does this include:

levels:	foundation	yes	no
	general	yes	no
	credit	yes	no
or year (specify time if it varies)			
	S3	yes	no
	S4	yes	no
	S5	yes	no
	S6	yes	no
	repeated year	yes	no
	additional year(s)	yes	no

3.6 Can students do longer work experience in foundation, technical and practical courses? yes no

3.7 Can a permanent work placement be made for a student taking technical and practical courses at the foundation level? yes no

3.8 Can a student have more than one work placement (in more than one subject per year, e.g.. sample more than one career)? yes no

3.9 Please tick the following areas where there is work experience in your school:

	SCOTVEC	SEA	OTHER
technological applications			
social and environmental			
language and communications			
mathematics and applications			
religious, moral and physical education			
science and applications			
creative and aesthetic studies			
other electives			

3.10 What does your school do for students who are not progressing in foundation, technical and practical subjects?

_____

_____

_____

_____

3.11 What is the total percentage of students in your school in foundation courses for:

S3___%
S4___%
S5___%
S6___%

3.112 What is the total number of students in your school?__

3.121 What percentage of students in your school were presented for standard grade examinations who were at foundation level:

S3___%
S4___%
S5___%
S6___%

3.122 What percentage of students had no attainment whatsoever;

S3___%
S4___%
S5___%
S6___%

3.123 If you can describe the trend in your school for the last four years for non-attainment please do so (for those at foundation level).

3.124 What number of students at the foundation level in your school did not sit the exams?

S3___
S4___
S5___
S6___

3.125 Can you state if the numbers of students have increased or decreased over the last four years who are attaining at the foundation level?

_____

_____

_____

3.126 What number of foundation students had non-attainment in either;

Math or English?

S3__ S3__

S4__ S4__

S5__ S5__

S6__ S6__

3.13 What, in your opinion, could improve school experience for low attaining students (e.g.. length of time / number of placements)?

_____

_____

_____

3.14 Given there is student entitlement, please tick one of the following if you agree:

.placement should be co-ordinated with apprenticeship__

.placement should be integrated with apprenticeship __

3.15 Is there any integrated approach of the above nature currently being provided for low attaining students? yes no

Please describe: _____

_____

_____

3.16 In your opinion is the continuous evaluation and progress of students at the foundation level grounded with in expectations of the ability level for this group?

yes no

PROMOTION

4.1 Can the student functioning with low ability be promoted:

.within subject each year yes no

.by year all subjects yes no

.partially by modules / units yes no

.partially with fewer subjects yes no

.other _____

4.2 Are there alternative arrangements for the promotion for other student groups (e.g.. special education)? yes no

4.3 What would distinguish these student functioning at foundation level (e.g.. lower ability) from special need / education students?

Comment please _____

_____

_____

4.4 Is promotion based on multiple of factors? yes no

4.5 Please outline the main features guiding promotion;

_____

_____

_____

4.6 Is there testing; .in-class examination yes no

.year-end yes no or

.term testing? yes no

4.7 Is partial completion recognised (by modules)? yes no

4.8 What discretion could be used with in promotion for students who do well during the term but experience test anxiety and do not perform well on the examination? (e.g.. may have test anxiety or a bad day)

_____

_____

4.9 If a student does not sit an exam can s/he still achieve a pass (for other than medical reasons) with alternative evaluation? yes no

4.10 What is the weighting given to written work vs. practical work?

equal weighting

60-40 weighted to written work

other (please explain)_____

4.11 What in your experience do you think would increase student attainment in technical and vocational courses at the foundation level?

Please comment _____

_____

_____

_____

_____

THANK YOU for completing this questionnaire.

Please feel free to add any additional comments.

If you wish a summary of the results of this survey write in your name and address below.

APPENDIX B

AIMS OF THE TECHNICAL AND VOCATIONAL EDUCATION INITIATIVE, (MSC WRIT, 1982)

(a) In conjunction with LEAs to explore and test ways of organising and managing the education of 14-18 year old people across the ability range so that:
(i) more of them are attracted to seek the qualifications or skills which will be of direct value to them at work and more of them achieve these qualifications and skills;
(ii) they are better equipped to enter the world of employment which will await them;
(iii) they acquire a more direct appreciation of the practical application of the qualifications for which they are working;
(iv) they become accustomed to using their skills and knowledge to solve the real-world problems they will meet at work;
(v) more emphasis is placed on developing initiative, motivation and enterprise as well as problem-solving skills and other aspects of personal development;
(vi) the construction of the bridge from education to work is begun earlier by giving these young people the opportunity to have direct contact and training/planned work experience with a number of local employers in the relevant specialisms;
(vii) there is close collaboration between local education authorities and industry / commerce public services etc., so that the curriculum has industry's confidence.

(b) To undertake (a) in such a way that:
(i) the detailed aims can be achieved quickly and cost effectively;
(ii) the educational lessons learned can be readily applied in other localities and other groups among the 14-18 year olds;
(iii) the educational structures or schemes established to further the aims of the initiative should be consistent with progressive developments in skill and vocational training outside the school environment, existing vocational education for under-16 year old people, and higher education;
(iv) emphasis is placed on careful monitoring and evaluation;
(v) individual projects are managed at local level;
(vi) the overall conduct, assessment and development of the Initiative can be assessed and monitored by the MSC and the TVEI Unit it has established for this purpose.

Definition of Foundation

The Foundation award would be based on a desirable minimum level of competence to be defined within each subject' the target population consisting largely of those pupils outwith the present system of awards. Competence at this level would be graded 'Pass'. We think it appropriate that pupils failing to achieve a 'Pass' but attending school sufficiently for the purpose of internal assessment and taking the external terminal assessment should receive an award. Such pupils would be given the grade CCO, that is course completed. [approximately 25-30%] (Dunning, 1977)

APPENDIX C

CHANGING EMPHASIS OF TECHNOLOGICAL STUDIES (MET, 1984)

Technological studies have traditionally met the following needs: the provision of introductory skills and knowledge for the trades; preparation for post-secondary education and training; the development of personal and employment-related skills; the development of technical literacy; the heightening of aesthetic appreciation; and the development of problem-solving skills. All of these needs are currently being met to varying degrees by programs offered in industrial arts, occupational/vocational, and technical courses. Although these needs will not change dramatically in the near future, the emphasis or focus of many courses must change to suit changing technologies.

Business and industry has been making increasing use of computers, robotics, lasers, synthetic materials, and micro-electronics. Training in specialised skills and subjects is still an appropriate objective, but students also need to become much more aware of the interrelationships among the various disciplines of technological studies and to acquire a good understanding of applied mathematics and science. It is thus particularly important that advanced-level courses focus on changing technologies because in these courses students receive basic preparation for university or other post-secondary studies.

BASIC LEVEL:

Basic-level courses focus on the development of personal skills, social understanding, self-confidence, and preparation for the world of work. These courses help students to prepare for a successful, independent home and working life, to manage personal financial resources, to communicate effectively, and to develop attitudes that foster respect for the environment, good health and fitness, and a positive approach towards work and leisure. Technological studies courses at the basic level should provide a good preparation for direct entry into employment from secondary school.

The guidelines for basic-level courses provide latitude for the design of a range of courses at the same grade level. Thus, courses in a particular grade may be designed for selected groups of students who have varying degrees of interest and skill. Courses offered at the basic level of difficulty are not oriented exclusively towards exceptional pupils.

Basic-level courses should focus primarily on practical activities; theoretical concepts should be kept to the necessary minimum, with knowledge and concepts related directly to the practical activities whenever possible. (Technological Studies Intermediate & Senior Divisions, 1985)

APPENDIX D

The following table is of standard test scores expressed in percentages per standard deviation (St. d.) for ability (Test Service Bulletin Number 48, The Psychological Corp., cited in S. Isaac and W. Michael, 1981). It relates to the theory of ability or intelligence originally based on the results of standardised tests. This theory provides the statistical grounding for all test results.

This theory remains fundamental to diagnostic testing and for Ontario remains in use for special education assessments and for integration of students into regular classrooms. This theory forms the basis of testing students whether by specialists or schoolteachers and is necessary for both practical and theoretical uses.

Table 1

The Range of Standard Test Scores: Comparing Percentages to Standard Deviations and Intelligence

Percentage							
.13%	2.14%	13.59%	34.13%	34.13%	13.59%	2.14%	.13%
St. d.							
-4 to -3	-3 to -2	-2 to -1	-1 to 0	0 to +1	+2 to +3	+2 to +3	+3 to +4
IQ Deviation							
55	70	85	100	115	130	145	

Further, this normal distribution provides a theoretical description of the ability variable in the student population.

BIBLIOGRAPHY

Adams, M., Groen, R., Buckland,F. and Semple,W., (1976), *Educational Perspectives*, Contract Research for Ministry of Education, Ontario.

Ainley, P., (1990), *Vocational Education and Training*, Cassell Educational Ltd., London.

Ainley, P. and Corney, M., (1990), *Training For The Future: the Rise and Fall Of the Manpower Services Commission*, Cassell, London.

Allan & Gartside, (1989), *Induction into Further Education*, The Scottish Council for Research in Education, Edinburgh

Altbach, P., (1991), "Trends in Comparative Education," in *Comparative Education Review*, Vol. 35, No. 3, August, pp.491-507.

Anderson, G., (1990), *Fundamental Education Research*, Falmer Press, London.

Ashton, D., Maguire, M. and Spilsbury, M., (1990), *Restructuring the Labour Market, Implications for Youth*, MacMillan, London.

Atherton, G., (1989), *In Special Need*, Scottish Consumer Council, Edinburgh.

Association of Canadian Curriculum Councils Science and Technology Task Group: A Imperative in Canada's Economic Development, May 1991.

Ball, S., (1990), *Politics & Policy Making in Education*, Routledge, London.

Barrett, S., and Fudge, C., (1981), *Policy and Action*, Methuen, London.

Beck, L. and Black, H. (1987), *What is Good Practice in TVEI? A study of the perceptions of participants in Lothian TVEI*, The Scottish Council for Research in Education, Edinburgh.

Beck, L. and Black, H., (1988), *The Proof of the Pudding, A study of the views of students in the Lothian pilot TVEI schools*, The Council for Research In Education, Edinburgh.

Bell, C., (1988), *Education-Industry Relationships in the First Scottish TVEI Pilot Projects, An Evaluation Report*, Centre for Education Sociology, Edinburgh University, Edinburgh.

Bell, C., Howieson, C., King, K. and Raffe, D., (1989), "The Scottish Dimension of TVEI", *Scottish Government Yearbook 1989*, Browne, A. and McCrone, D., (eds.), Edinburgh.

Bell, C., et al, (1990), *Working Together? Research, Policy and Practice. The Experience of the Scottish Evaluation of TVEI*, Department of Sociology, University of Edinburgh.

Benn, C., and Fairley, J., (eds.), (1986), *Challenging the MSC on Jobs: Enquiry into a National Disaster*, Education and Training, Pluto Press Ltd., London.

Black, H., (1988), "The National Certificate", in Brown, S., (ed.), Scottish Academic Press, Edinburgh, pp. 104-120.

Blackburn, P., (eds.), (1989), *Breaking The Barriers*, Victoria Status of Women, Victoria, B C.

Bower, G. and Hilgard, E., (1981), *Theories of Learning*, Prentice-Hall, Englewood Cliffs, N.J.

Boyd, B., (1997), *The Statutory Years Of Secondary Education In Scotland*, in Clark, M. and Munn, P., (eds.), Education in Scotland, Routledge, London, pp. 52-65.

Bremer, A., (1978), *Sources of Differences in School Achievement*, NFER Publ., Berk. UK.

Brighouse, T., & Moon, W., (1990), *Managing the National Curriculum*, Longman Publ., Essex.

Broadfoot, P., (1979), *Assessment, Schools and Society*, Methuen, London.

Brooks, J.G. and Brooks, M., (1993), *In search of Understanding: The Case for Constructivist Classrooms*, Association for Supervision & Curriculum Development, Alexandria, Virginia, U.S.A.

Brown, A., (1989), "The Context of Change: The Scottish Economy and Public Policy", in Brown, A. and Fairley, J., (eds.), (1989), *The Manpower Services Commission in Scotland*, Edinburgh University Press, Edinburgh, pp.3-33.

Brown, A. and Fairley, J., (eds), (1989), *The Manpower Services Commission in Scotland*, Edinburgh University Press, Edinburgh.

Cetron, M. and Davies, O., (1991), "Trends Shaping the World", adapted from *Crystal Globe: The Haves & Have-Nots of the New World Order*, St. Martin's Press, reprint in Futurist, Maryland, Oct. 1991, pp. 11-22.

Chitty, M. and Davies, O., (1986), *"TVEI; The MSC's Trojan Horse"*, in C. Benn and J.Fairley (eds.) Challenging the MSC on Education, Jobs and Training, Pluto Press Ltd., London, pp.76-98.

Chitty, C., (1989), *Towards a New Education System*, Falmer Press, Sussex, U K.

Chubb, J., and Moe, T., (1990), *Politics, Money, & America's Schools*, Brookings Institute, Washington, D C.

Chapman, M., (1986), *Plain Figures*, HMSO, London.

Clark, M., and Munn, P., (eds.), (1997), *Education in Scotland: Policy and practice from pre-school to secondary*, Routledge, London.

Clasen, J. and Freeman, R., (1994), *Social Policy in Germany*, Harvester Wheatsheaf, London.

Conlon, T., (1989), "The Battles of Yesteryear: Computing, SED and

MSC", in Brown, A. and Fairley, J., (eds.), (1989), *The Manpower Services Commission in Scotland*, Edinburgh University Press, Edinburgh, pp.126-143.

Conlon, T. and Copp, P., (eds.), (1999), *Computing in Scottish Education: The First Decade and Beyond*, Edinburgh University Press, Edinburgh.

Connors, B. and Sweeney, K., (1990), "The Dual System ", *ORBIT*, Ontario Institute for Studies in Education Publisher, Toronto, Apr., Vol. 21, No. 2.

Corson, D., (ed.) (1991), *Education for Work*, Multilingual Matters Ltd., Clevedon, England.

Cronbach, L., (1980), *Towards Reform of Program Evaluation*, Jossey-Bass, London.

Croxford, L., Howiesin, C. and Raffe,D., (1991), *Young People's Experiences of National Certificate Modules, Final Report*, Centre for Education Sociology, University of Edinburgh.

Crow, G., (1978), *Children at Risk*, Schocken Books, N Y.

Dale, R. (ed)(1985), *Education, Training and Employment, Towards a New Vocationalism*, Pergamon, Oxford, U K.

Dale, R., (1989), *The State and Education Policy*, Open University Press, Milton Keynes, U K.

Davies, B., (1990), *ORBIT*, Ontario Institute for Studies in Education Publisher, Toronto, April, Vol. 21, No. 2.

Davies, B., (1991), *The German School System*, Province of Ontario Education Officers' Association Conference, Conference Paper, Toronto, Canada.

Davis, E., (1981), *Teachers as Curriculum Evaluators*, Allen and Unwin, London.

Dennison, S.R., (1984), *Choice in Education*, IEA, London.

Department of Education and Science, (1990), *Technology in the National Curriculum*, HMSO.

Department of Education and Science, (1991), *Assessment in Technology*, HMSO.

Desjarlais, L. et al, (1974), *Needs and Characteristics of Students in the Intermediate Years, Ages 12-16*, OISE, Toronto, Canada.

Downey, L.W., (1988), *Policy Analysis in Education, Detselig Enterprises Limited*, Calgary, Alberta.

Drever, P., (1991), *School Effectiveness: Criteria and Evidence*, The Scottish Council for Research in Education, Edinburgh.

Easton, C., (1965), *A Framework for Policy Analysis*, Prentice Hall, Englewood Cliffs, N.J.

Elkind, D., "Adolescent Thinking and the Curriculum", New York Educational Quarterly, Winter, 1981, Vol. X11, NO.2, pp.18-24, reprinted in *Readings in Adolescent Development*, O. Wright, (ed.), (1981), The Board of Education for the City of Toronto, Toronto, Canada.

Epstein, H., (1978), "A Neuroscience Basis for Reorganizing Middle Grades Education" in Educational Leadership, 35:656-60, cited in *Getting it Right: Meeting the needs of the early adolescent learner*, J. Oppenheimer, Federation of Women Teacher' Association of Ontario, 1990.

Erdos, P. and Morgan, A., (1970), *Professional Mail Surveys*, McGraw Hill, London.

Fagerlind, I. and Saba, L., (1991), *Education & National Development: A Comparative Perspective*, Pergamon Press, London.

Fairley, J., and Paterson, L., "The Reform of Vocational Education and Training in Scotland", in *Journal of Scottish Educational Review*, Vol. 23, No. 2., November.

Farrell, J., (1991), "Education-industry partnerships are essential for the 90s", *The Canadian School Executive*, March.

Feuerstein, R., (1979), *Instrumental Enrichment*, University Park Press, Baltimore, Maryland, U.S.A.

Finch, J., (1984), *Education as Social Policy*, Longman, London.

Finn, D., (1987), *Training Without Jobs: New Deals and Broken Promises*, Macmillan Education Ltd., London, England.

Flude, M. and Hammer, M., (eds.)(1990), *The Education Reform Act 88*, Falmer Press, Sussex, UK.

Fullan, M., (1984), *The Meaning of Educational Change*, Teachers College Press, London.

Fullan, M., (1991), *The New Meaning of Educational Change*, 2nd edit., OISE Press, Toronto.

Fullan, M. and Kilder, A., (March 1992), *Implementation Strategies for the Restructuring of Education*, Report Prepared for the Ministry of Education, Ontario.

Fullan, M., "Turning Systemic Thinking on its Head", in *Phi Delta Kappan, July 1994*.

Freeman, H. and Sherman, C., (1970), *Social Research and Social Policy*, Prentice Hall, N.J., U.S.A.

Frey, J.H., (1989), *Survey Research by Telephone*, Sage Publisher Inc., London.

Gardner, H., (1991), *Multiple Intelligences, An Expanded View of Human Intellect*, Basic Books, New York, N.Y., U.S.A.

Gleeson, D., (1989), *The Paradox of Training*, Open University Press, Milton Keynes, UK.

Gleeson, D., (1990), *Training and Its Alternatives*, Open University Press, Milton Keynes, UK.

Goldfarb, (1987), *Dropout Survey*, Goldfarb Consultants Publishing, Toronto.

Government of Ontario Minister's Office, (1991), *Ontario Training & Adjustment Board Project*, Government of Ontario NEWS RELEASE, Nov. 1991, Toronto

Gray, J., McPherson, A.F., and Raffe, D., (1983), *Reconstruction of Secondary Education*, Routledge Kegan Paul, London.

Gregg, P., (ed.) (1976), "Towards Theoretical Premises in Policy Analysis", *Problems of Theory and Policy Analysis*, Lexington Books, London, pp. 151-168.

Habermas, J., (1974), *Theory & Practice*, Heineman, London.

Hargreaves, A., Gerin-Lajoie,D., and Theissen, D., (1991), *Years of Transition: Times for Change, A Review & Analysis of Pilot Projects, Investigating Issues in the Transition Years*, Unedited.

Hitchcock, G., (1988), *Education and Training: a survey of new initiatives*, Longman Group UK Ltd., Essex, England.

Hill, M., and Bramley, G., (1986), *Analysing Social Policy*, Blackwell Press, Oxford.

Hill, M., (1991), The Policy Process and the Modern State, Prentice Hall, Herfordshire, UK.

Howieson, C., (1989), 'The Impact Of MSC on Secondary Education' in Brown, A. and Fairley, J., (eds.), (1989), *The Manpower Services Commission in Scotland*, Edinburgh University Press, Edinburgh, pp.74-89.

Hunt, D., (1971), *Matching Models in Education: The Coordination of Teaching Methods with Student Characteristics*, Monograph Series No. 10, Ontario Institute for Studies in Education, Toronto, Canada.

Isaac, S. and Michael, W., (1981), *Handbook in Research & Evaluation*, 2nd edit. Edits Publ., Calif., U.S.A.

Johnston, G., Johnston, J. and DeMatta,R., (1991), "Predictive Exploration of Education Failure", in *Canadian Journal of Special Education*, Vol. 7, No. 7.

Jones, C., (1985), *Patterns of Social Policy*, Tavistock Publ., London.

King, A., Warren, W.K., Michalski, C. and Peart, M.J., (1988, 1989),

Improving Student Retention in Ontario Secondary Schools, Queen's Printer, Toronto, Canada.

Levin, H.M. and Lockheed, M.E., (eds.) (1991), "Creating Effective Schools" ch.1 of Levin and Lockheed *Effective Schools in Developing Countries*, Education and Employment Division, Population and Human Resources Dept., The World Bank, pp. 2-20.

Lothian Educational Authority, (1991), *School Leavers Destinations*, Regional Council, Department of Education, New Horizons, Edinburgh.

Lothian Educational Authority, (undated), Lothian sample syllabus, Edinburgh

Lowi, T., (1970), "Decision Making vs. Policy Making: Towards an Antidote for Technocracy", *Public Administration Review*, May/June, pp.314-325.

Lyon, M., Black, H., and Thorpe, G., (1990), *Pupils and the Curriculum*, The Scottish Council for Research in Education, Edinburgh.

Lyon, M. et al, (1990), *Technology in the National Curriculum*, DES and the Welsh Office, HMSO.

Malcolm, H. and Johnston, M., (1991), *Working Out, a study of the work experience module in secondary schools in Lothian*, The Scottish Council for Research in Education, Edinburgh

Mallinson, V., (1986), "The Question of Comparability as between Educational Systems in Europe", *Oxford Review of Education*, Vol. 12, No. 2, pp.117-124.

Manpower Services Commission (MSC), (1981), *A New Training Initiative-Agenda For Action*, London, MSC

Manpower Services Commission, (1982), *Aims of the Technical and Vocational Education Initiative*, MSC Writ.

Manpower Services Commission, (1984), *Annual Review; TVEI: Terms of Reference*, class handout University of Edinburgh.

Manpower Services Commission, (1985), *Competence and Competition*, HMSO.

Manpower Services Commission, (1991), *The Dual System*, MSC Staff Meeting Resource Material.

Marsh, C., (1982), *The Survey Method*, Allen and Unwin Publisher, London.

McCulloch, G., (1991). "Technical and Vocational Schooling, Education for Work", in Corson, D. (ed), *Education For Work: Background to Policy & Curriculum*, Open University Multilingual Matters Ltd., Bristal, Pennsylvania, U.S.A., pp.111-118.

McPherson, A., (1992), "Measuring added value in schools", in *Briefing*, National Commission on Education Publ., London.

Miles, H.B., (1979), *Some factors affecting attainment at 18+*, Oxford, UK.

Moser, C. and Kalton, G., (1971), *Survey Methods in Social Investigations*, Gower Publ., UK.

Munn, P. and Devor, E., (1990), *Asking Questions*, Scottish Council for Research in Education, Edinburgh.

Munn, P., (1997), "Future Directions", in Clark, C. and Munn, P., (eds.), *Education in Scotland*, Routledge, London, pp.115-124.

Nash, R., (1976), *Teacher expectations and pupil learning*, Routledge & Kegan Paul, London.

Natriello, G. et al, (1990), *Schooling Disadvantaged Children, Racing Against Catastrophe*, Teachers College, Columbia Univ. Press, NY.

Nuttall, D., (ed)(1986), *Assessing Educational Achievement*, Falmer, Sussex, UK.

Oakes, J., (1992) "Can Tracking Research Inform Practice", *Journal of Educational Research*, May, pp.52-56.

Conference Board of Canada, *Ontario Skill Requirements*, Mimeographed handout, Student Conference, Ministry of Skills and Development, (undated).

Ontario Ministry of Education, (1984), *Technological Studies Intermediate & Senior Divisions, 1985, Part A: Policy for Program Planning*, Queen's Printer, Toronto.

Ontario Ministry of Education, (1987), *Strategic Planning: A Paper for Discussion*, Occasional Paper No. 12, July, Toronto.

Ontario Ministry of Education, (1988), *Science is Happening Here*, 1989-90, Queen's Printer, Toronto.

Ontario Ministry of Education, (1990a), *Technical Education*, Consultation Paper, October, Toronto.

Ontario Ministry of Education, (1990b), *Action Plan 1990-94, Restructuring the Education System*, Toronto.

Ontario Ministry of Education, (1990c), *Key Statistics, 1989*, Queen's Printer, Toronto.

Ontario Ministry of Education, (1991), *Science in Primary & Junior Education, Report of progress*, Queen's Printer, Toronto.

Oppenheimer, J., (June 1990), *Getting it Right: Meeting the Needs of the Early Adolescent Learner*, Federation of Women's Teachers' Association of Ontario, Toronto, Canada.

Ostram, V., (1976), "Language, Theory and Empirical Research in Policy Analysis", in Gregg, P., (ed), *Problems of Theory and Policy Analysis*,

Lexington Books, London, pp.9-18.

Owens, R., (1970), *Organizational Behavior in Schools*, Prentice Hall Inc., N.J, U.S.A.

Paterson, L., (undated), "Local Variations in the Scottish pilot projects of the Technical and Vocational Education Initiative", Edinburgh, *Centre for Education Sociology*, pp.1-45.

Paul, J.P., (1991), 'Structural Reform of the Education System: The Wave of the Future', International Experience, Europe, Helsinki Institute, Helsinki, Finland, Conference Paper, Toronto, Canada.

Pollard, A., (1988), *Education, Training & the New Vocationalism*, Milton Keynes, Open University Press, UK.

Postlethwaite, T.N. and Wiley, D.E., (1991), "Science Achievement in Twenty Three Countries", *National Economic Review*, 1985.

Prais, S.J. and Wagner, K., (1985), "Schooling Standards in England & Germany: Some Comparisons, Bearing on Economic Performance", *National Institute Economic Review*, pp.53-72.

Pring, R., (1985), "In Defense of TVEI", in *Forum*, V 28, Number 1, Autumn, pp.4-11.

Quirouette, P., Saint-Denis, O. and Huot, N., (1990), *Identifying Probable School Leavers in Ontario Highschools*, Queen's Printer, Toronto.

Raffe, D., (1984), (ed.), *FOURTEEN TO EIGHTEEN: The Changing Patterns of Schooling in Scotland*, Aberdeen University Press, Aberdeen.

Raffe,D.,(1988), *Education and the Youth Labour Market*, Falmer, Sussex, UK.

Raffe, D. and Howieson, C., (1990), *The Follow-up Study of the First Pilot TVEI Cohort in Scotland*, CES, Edinburgh.

Raffe,D., (1991), "Scotland v. England: The Place of 'Home Internationals' in Comparative Research" in Ryan, P. (ed.) *International Comparisons of Vocational Education and Training*, Falmer Press, Lewes, Sussex, UK, pp.47-67.

Raffe, D., (1997), "Upper Secondary Education", in Clark, M. and Munn, P., (eds), *Education In Scotland*, Routledge, London, pp.67-80.

Raggett, P. and Weiner, G., (1985), *Curriculum and Assessment*, Pergamon Press, UK.

Reynolds, K., (1991), "Restructuring the Welfare State - The Case of the Abolition of the Inner London Education Authority", in *Critical Social Policy*, Longman Group, Essex, Issue 32, pp.72-81.

Robins, K. and Webster, F., (1989), *The Technical Fix*, MacMillan Educ. Ltd., London.

Rosenthal, R. and Jacobson, L., (1968), *Pygmalion in the Classroom*, Holt, Rinehart and Winston Inc., N.Y., N.Y.

Rutter, M., Maughan,B., Mortimore,P. and Ouston,J., with Smith,A., (1979), *fifteen hundred hours*, Open Books, London.

Sarason, S., (1990), *The Predictable Failure of Educational Reform*, Jossey-Bass, San Francisco.

Saunders, L., (1991), "Education, Work and the Curriculum", in *Journal of Policy Studies*, Vol. 12, No. 2., pp 13-26.

Saunders, M. and Halpin, D., (1990) "TVEI and the National Curriculum", *British Journal of Educational Studies*, Vol. XXXV111, Number 3.

Scherman, H. and Presser, S., (1981), *Questions and Answers in Attitude Surveys*, Academic Press, London.

Schmid, G. and Reissert, B., (1989), "Do Institutions Make a Difference? Financing Systems of Labour Market Policy", in *Journal of Public Policy*, Vol. 8, No. 2., pp.125-149

Scotland Materials Development Pack, (1990), TVEI Scotland Open Learning Network, HMSO.

Scotland Public General Statutes, *The Education Act*, (1980) c.44.

Scottish Education Department, (1977a), *Assessment for All: Report of the Committee to Review Assessment in the Third and Fourth Years in Secondary Education in Scotland*, Edinburgh, HMSO, (Dunning Report).

Scottish Education Department, (1977b), *The Structure of the Curriculum in the Third and Fourth Years of the Scottish Secondary School*, HMSO, (Munn Report).

Scottish Education Department, (undated), *Standard Grade: Setting New Standards For All Scottish Pupils.*

Scottish Education Department, (1979), *Curriculum and Assessment in the Third and Fourth Years of Secondary Education in Scotland: A Feasibility Study*, HMSO.

Scottish Education Department, (undated), *Curriculum and Assessment in the Third and Fourth Years of Secondary Education in Scotland: Proposals for Action*, SED.

Scottish Education Department, (undated), *Standard Grade: Setting New Standards For All Scottish Pupils.*

Scottish Education Department, (1980), *The Munn and Dunning Reports: The Government's Development Programme*, SED.

Scottish Education Department, (1982a), *The Munn and Dunning Reports: Framework For Decision*, SED, Sept.

Scottish Education Department, (1982b), *The Munn and Dunning Reports: Framework For Decision, A Summary of the Government's Proposals for*

Implementation, SED, Sept.

Scottish Education Department, (1983), *16 - 18s in Scotland: An Action Plan, Edinburgh*, SED.

Scottish Education Department, (1986), *Working Together: Education and Training*, Cmnd 9823, HMSO.

Scottish Education Department, (1988), *Effective Secondary Schools*, SED, HMSO.

Scottish Education Department, (1989), *Learning and Teaching in TVEI*, SED, HMSO.

Scottish Education Department, (Oct. 1990 and Sept. 1991), *The National Certificate 1988-89*, Edinburgh, HMSO.

Scottish Education Department, (May 1991), *School Leavers' Qualifications*, 1988-89,Edinburgh.

Scottish Education Department, (June 1991), *School Leavers' Destinations*, 1987-88, Edinburgh.

Scottish Education Department with the Scottish Qualifications Authority, (undated), *Standard Grade: setting New standards for all Scottish Students*, Edinburgh, Scotland.

Scottish Executive, Feb. 2000, *Education and training in Scotland*, Scottish Education Department, Victoria Quay, Edinburgh, Scotland.

The Scottish Office, (1998), *going to school in Scotland*, Edinburgh, Scotland.

Scottish Vocational Education Council, (undated), *Introducing the Record of Examination*, SCOTVEC, Glasgow.

Scottish Vocational Educational Council, (undated), *Selling the Standards in Scotland*, SCOTVEC, Glasgow.

Scottish Vocational Educational Council, *Stepping Stones to Success*, Hanover House, Glasgow.

Senker, S., (1990), "Some Economic and Ideological Aspects of the Reform of Education and Training in England and Wales in the Last Ten Years" in *Journal of Educational Policy*, Vol. 5, No. 2, pp. 113-126.

Shayer, M., (1988), *Towards a Science of Science Teaching, Cognitive Development and Curriculum Demand*, Heinemen Educational Books, Toronto, Canada.

Shirley, I.(1991), "State policy and Employment" in Corson, (ed.), *Education for Work: Background to Policy and Curriculum*, Multilingual Matters Ltd., Clevedon, England.

Slavin, R. et al, (1989), *Effective programs for students at risk*, Allen and Unwin, USA.

Slavin, R. et al, (1991), "Never Streaming: Prevention and Early Intervention as an Alternative to Special Education", *in Journal of Learning Disabilities*, Vol. 24, No. 5, June-July.

Stafford, Anne, (1989), "Young People and the MSC", in Brown, A. and Fairley, J., (eds.), (1989), *The Manpower Services Commission in Scotland*, Edinburgh University Press, Edinburgh.

Saunders, M. and Halpin, D., (1990), "TVEI and the National Curriculum: A Cautionary Note", *British Journal of Educational Studies*, Vol.XXXV111, Number 3.

Steingold, K., (1991), "Restructuring for Learning with Technology: The Potential for Synergy", in *Kappan*, Sept.

Stern, D., et al, (1986), *Reducing the High School Dropout Rate in California: Why We Should and How We May*, University of California, Berkeley, U.S.A.

Sudman, S. and Bradburn, N., (1982), *Asking Questions*, Jossey-Bass Publ., London.

Weston, P., (1984), " Learning their Place: differentiation and the S3/S4 curriculum in practice and prospect", in Raffe, D., (ed.),(1984), *FOURTEEN TO EIGHTEEN: The Changing Patterns of Schooling in Scotland*, Aberdeen University Press, Aberdeen, pp.25-57.

Whitehead, A.N., (1929), *The Aims of Education*, The Free Press, N.Y., N.Y.

Williams, (1986), *Do Scottish EA's Differ in Their Exam Results?*, The Scottish Council for Research in Education, Edinburgh.

Whitmore, R., (1984), "Modeling the Policy/Implementation the Distinction", *Policy and Politics*, Vol. 12, No. 3., pp.241-267.

Willis, P., 1986, "Forward", in Finn, D., *Training Without Jobs:New Deals and Broken Promises*, MacMillan Education Ltd., London, England, pp. xiv-xxi.

Wright, O., (ed.) (1984), *Observing Adolescents, Toronto Observation Project*, Board of Education, Toronto.

Yin, R., (1994), *Case Study Research*, Sage Publisher, London, UK.